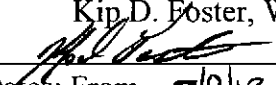


VPDES PERMIT FACT SHEET

This document gives the pertinent information concerning the reissuance of the VPDES permit listed below. This permit is being processed as a **minor municipal** permit. The effluent limitations contained in this permit will maintain the Water Quality Standards of 9 VAC 25-260-00 et seq.

The discharge results from the operation of a **0.60 MGD extended aeration activated sludge treatment plant** serving the Town of Stuart. This permit action consists of adding *E. coli* and dissolved oxygen limits, decreasing monitoring frequencies for BOD₅ and total suspended solids, revising the BOD₅ and total residual chlorine limits, and revising the special conditions. (SIC Code: 4952)

1. **Facility Name and Address:**
Town of Stuart WWTP
PO Box 422
Stuart, VA 24171
Location: 709 Commerce Street, Stuart, Virginia
2. **Permit No:** VA0022985 Existing Permit Expiration Date: July 5, 2013
3. **Owner Contact/ Facility Contact:**
Terry Tilley, Town Manager, (276) 694-3811; tilley@va.net
Andrew Dalton, Plant Manager, (276)-694-4477; swwtpva@yahoo.com
4. **Application Complete Date:** February 14, 2013
Permit Drafted By: Becky L. France, Water Permit Writer
Date: March 14, 2013 (Revised 3/27/13, 4/19/13)
DEQ Regional Office: Blue Ridge Regional Office
Reviewed By: Kip D. Foster, Water Permit Manager
Reviewer's Signature:  Date: 6/19/13
Public Comment Period Dates: From 5/9/13 To 6/7/13
5. **Receiving Stream Classification:**
Receiving Stream: South Mayo River (River Mile: 30.78)
Watershed ID: VAW-L43R (Upper South Mayo/ Russell Creek Watershed)
River Basin: Roanoke River
River Subbasin: Roanoke River
Section: 3g
Class: IV
Special Standards: none
1-Day, 10-Year Low Flow: 5.5 MGD 1-Day, 10-Year High Flow: 8.8 MGD
7-Day, 10-Year Low Flow: 6.1 MGD 7-Day, 10-Year High Flow: 10 MGD
30-Day, 5-Year Low Flow: 9.5 MGD Harmonic Mean Flow: 21 MGD
Tidal: No 303(d) Listed: Yes (bacteria)

Attachment A contains a copy of the flow frequency determination memorandum.

6. **Operator License Requirements: II**7. **Reliability Class: I**8. **Permit Characterization:**

- | | |
|--|---|
| <input type="checkbox"/> Private | <input type="checkbox"/> Interim Limits in Other Document |
| <input type="checkbox"/> Federal | <input type="checkbox"/> Possible Interstate Effect |
| <input type="checkbox"/> State | |
| <input checked="" type="checkbox"/> POTW | |
| <input type="checkbox"/> PVOTW | |

9. **Wastewater Treatment System:** A description of the wastewater treatment system is provided below. See **Attachment B** for the wastewater treatment schematic and **Attachment C** for a copy of the site inspection report. Treatment units associated with the discharge are listed in the table below.

Table I
DISCHARGE DESCRIPTION

Outfall Number	Discharge Sources	Treatment (Unit by Unit)	Design Flow
001	Town of Stuart WWTP (domestic and industrial wastewater)	mechanical bar screen aerated grit collector activated sludge aeration basins secondary clarifiers (3) chlorine disinfection chlorine contact tank dechlorinator two aerobic sludge digesters sludge belt filter press	0.60 MGD

The Town of Stuart WWTP was built before 1975 and upgraded in 1988 to the present design capacity of 0.60 MGD. The Town of Stuart operates an extended aeration activated sludge plant for the residents of the Stuart area. The wastewater works consists of a mechanical bar screen, aerated grit collector, activated sludge aeration basins, secondary clarifier, chlorine disinfection, chlorine contact tank, dechlorinator, and sludge digesters.

From the grit collector, wastewater flows to two parallel aeration basins. From the aeration basins, the wastewater is split between three parallel secondary clarifiers. Polymer may be added to aid in settling. From the secondary clarifiers, the wastewater overflows the weirs and enters the diversion chamber where chlorine gas is added. The chlorinated wastewater then flows through a pipe to a baffled chlorine contact tank. From the contact tank the treated wastewater is dechlorinated with sulfur dioxide and discharged into the South Mayo River.

10. **Sewage Sludge Use or Disposal:** A VPDES Sewage Sludge Permit Application Form was submitted for this facility to address disposal of sewage sludge from the wastewater treatment facility. Sludge is added in two aerated digesters having a total capacity of 86,550 gallons.

Periodically, the sludge is pumped to the 0.5 meter filter belt press for thickening to a solids concentration of greater than 20 percent. The supernatant of the process is recycled to the head of the plant. Dewatered sludge is stored in a temporary storage building. The concrete floor is equipped with a drain line which collects any seepage from the sludge and conveys it back to the plant for treatment. If the storage building is full, the plant's sludge is stored in three uncovered sludge drying beds. The drying beds have an underdrain system to collect seepage and redirect it to the treatment facility.

Dewatered sludge is periodically hauled to the Republic Landfill in Rougemont, North Carolina for disposal. The permittee also has a backup option to land apply to local farm land under the responsibility of the Town according to the Sludge Management Plan (SMP) submitted with the application. The SMP indicates that biosolids will be applied infrequently (once every three years), not exceeding the nitrogen agronomic rate, to each land application site. The biosolids meet the maximum monthly average pollutant concentration (PC) requirements in Table 3 of 9 VAC 25-31-540, achieve Class B pathogen reduction by aerobic digestion, and vector attraction reduction through a minimum 38 percent reduction in volatile solids or any other alternative methods that comply with 9 VAC 25-31-720.

11. **Discharge Location Description:** A USGS topographic map which indicates the discharge location, any significant dischargers, any water intakes, and other items of interest is included in **Attachment D**. The latitude and longitude of the discharge is N 36°38'09.99", E 80°15'15.0".

Name of Topo: Stuart, VA Number: 019A

12. **Material Storage:** Chlorine and sulfur dioxide cylinders are stored in a ventilated building.
13. **Ambient Water Quality Information:** Memoranda or other information which helped to develop permit conditions (special water quality studies, STORET data, and any other biological and/or chemical data, etc.) are listed below.

Flow Frequencies

Flow frequencies for outfall 001 were determined by using flow frequencies for the gauge on the South Mayo River near Nettleridge, Virginia. The flow values at the discharge point were determined by drainage area proportions. There was a slight increase in the high flow 1Q10 and a decrease in the 7Q10 from the values in the previous reissuance. **Attachment A** contains a copy of the flow frequency memorandum.

Receiving Stream Water Quality Data

The nearest STORET monitoring station (4ASMR033.98) is located on the South Mayo River at the State Road 787 bridge approximately 3.2 miles upstream from the discharge from the Town of Stuart WWTP (**Attachment E**). The 90th percentile stream pH and temperature, used in the

wasteload allocation spreadsheet were determined from these STORET station data. The mean hardness value from the STORET station was below 25 mg/L. Hardness values below 25 mg/L are off the scale used to establish the water quality criteria hardness equation to determine metals criteria. Therefore, a default hardness of 25 mg/L was used in the spreadsheet.

Endangered Species Review

The Department of Conservation and Recreation's Division of Natural Heritage has designated a segment of stream beginning two miles upstream and ending one mile downstream of the discharge location as a Stream Conservation Unit (SCU). This SCU (Poorhouse Creek-Mayo River) has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resource of concern associated with this SCU is the orangefin madtom. The Roanoke logperch is classified as endangered by the Virginia Department of Game and Inland Fisheries (VDGIF). The Roanoke logperch is listed as a federal endangered species but its presence has not been confirmed.

According to Virginia Department of Game and Inland Fisheries (VDGIF) records, this section of the South Mayo River is predicted habitat for the state threatened orangefin madtom. In addition, the South Mayo River upstream of this discharge has been designated a wild trout stream. The VDGIF identified habitat for freshwater mussels and recommended that more stringent proposed EPA ammonia criteria be implemented in the permit. DEQ acknowledges the research to support lower ammonia water quality criteria to protect mussels. The comments EPA received for the draft ammonia criteria are still under consideration. These criteria may not be final in Virginia for a few years and the exact numerical value of the proposed criteria may change during this process. A copy of the Division of Natural Heritage report information and the VDGIF information on species of concern in the area of the discharge is included in **Attachment E**.

Total Daily Maximum Load (TMDL) Study

The Town of Stuart WWTP discharges into the Upper South Mayo River/ Russell Creek Watershed (VAW-L43R) as described in the 2010 Impaired Waters Summary (**Attachment E**). This 5.77 mile impaired segment of the South Mayo River (L43R-01-BAC) extends from the confluence with Russell Creek downstream to the confluence of Spoon Creek.

The impairment use is recreation. The *Bacteria TMDL for South Mayo River Patrick County, Virginia* report contains an *E. coli* allocation for this facility. The TMDL allocation of $1.04E + 12$ is calculated from the permit's effluent limit of 126 cfu/100 mL and a design flow of 0.60 MGD. The TMDL was published January 2004 and revised on February 2004. The TMDL report was approved by the EPA on February 27, 2004 and the State Water Control Board on June 17, 2004.

14. **Antidegradation Review and Comments:** Tier 1 _____ Tier 2 X Tier 3 _____

The State Water Control Board's Water Quality Standards includes an antidegradation policy (9 VAC 25-260-30). All state surface waters are provided one of three levels of antidegradation protection. For Tier 1 or existing use protection, existing uses of the water body and the water quality to protect these uses must be maintained. Tier 2 water bodies have water quality that is

better than the water quality standards. Significant lowering of the water quality of Tier 2 waters is not allowed without an evaluation of the economic and social impacts. Tier 3 water bodies are exceptional waters and are so designated by regulatory amendment. The antidegradation policy prohibits new or expanded discharges into exceptional waters.

The antidegradation review begins with Tier determination. The South Mayo River is not listed as a public water supply in the segment where the discharge is located. The South Mayo River in this segment (VAW-L43R) is listed on Part I of the 303(d) list for exceedances of the water quality criteria for *E. coli*. According to Agency guidance, *E. coli* bacteria should not be used relative to establishment of antidegradation tier. There are no pollutant data that indicate that the water quality of the stream is not better than the water quality standards. Therefore, this segment of the South Mayo River is classified as a Tier 2 water, and no significant degradation of existing quality is allowed.

For purposes of aquatic life protection in Tier 2 waters, “significant degradation” means that no more than 25 percent of the difference between the acute and chronic aquatic criteria values and the existing quality (unused assimilative capacity) may be allocated. For purposes of human health protection, “significant degradation” means that no more than 10 percent of the difference between the human health criteria and the existing quality (unused assimilative capacity) may be allocated. The antidegradation baselines for aquatic life and human health are calculated for each pollutant as follows:

Antidegradation baseline (aquatic life) = 0.25 (WQS – existing quality) + existing quality

Antidegradation baseline (human health) = 0.10 (WQS – existing quality) + existing quality

Where:

“WQS” = Numeric criterion listed in 9 VAC 25-260-00 et seq. for the parameter analyzed

“Existing quality” = Concentration of the parameter being analyzed in the receiving stream

When applied, these “antidegradation baselines” become the new water quality criteria in Tier 2 waters, and effluent limits must be written to maintain the antidegradation baselines for each pollutant. Antidegradation baselines have been calculated as described above and included in **Attachment G**.

The Town of Stuart WWTP began discharging in 1975 and upgraded in 1988 to the present design capacity of 0.60 MGD. The water quality criteria for dissolved oxygen predate the Stuart WWTP discharge so effluent limits have been established to maintain the existing high level of dissolved oxygen in the stream. These limits prevent a significant lowering of DO more than 0.20 mg/L from the existing level (90 percent DO saturation value) in the receiving stream. Water quality criteria for ammonia, copper, zinc, chlorine, and other pollutants were not adopted until 1992, after completion of the 0.60 MGD treatment facility. In accordance with Guidance Memo 00-2011, the application of antidegradation for an existing discharge to Tier 2 waters consists of ensuring that all water quality criteria are met and establishing the existing baseline water quality to be maintained in the event of future expansions or new discharges to the same

stream segment. The permit limits for this reissuance are in compliance with antidegradation requirements set forth in 9 VAC 25-260-30.

15. **Site Inspection:** Date: 10/24/12 Performed by: Becky L. France
Attachment C contains a copy of the site inspection memorandum. The last DEQ technical compliance inspection was conducted on October 29, 2008 by Ryan Hendrix.
16. **Effluent Screening and Limitation Development:** DEQ Guidance Memo 00-2011 was used to develop water quality based limits pursuant to water quality standards (9 VAC 25-260-5 et seq.). Refer to **Attachment G** for the wasteload allocation spreadsheet and effluent limit calculations. See **Tables II-V** on pages 25-28 for a summary of limits and monitoring requirements and **Table VI** on pages 29-30 for details regarding changes made to the effluent limitations and monitoring requirements.

A. **Mixing Zone**

The MIXER program was run to determine the percentage of the receiving stream flow that could be used in the wasteload allocation calculations. The program output indicated that 100 percent of the 7Q10 and 63.93 percent of the 1Q10 may be used to calculate acute and chronic wasteload allocations (WLAs). A copy of the printout from the MIXER run is enclosed in **Attachment G**.

B. **Effluent Limitations for Conventional Pollutants**

Flow – The permitted design flow of 0.60 MGD for this facility is taken from the previous permit and the application for the reissuance. In accordance with the current VPDES Permit Manual, flow is to be measured on a continuous basis with totalizing, indicating, and recording equipment.

pH – Between January 2010 and December 2012, there were no exceedances of the pH limitations. The pH limits of 6.0 S.U. minimum and 9.0 S.U. maximum have been continued from the previous permit. These limits are based upon the water quality criteria in 9 VAC 25-260-50 for Class IV receiving waters and are in accordance with federal technology-based guidelines, 40 CFR Part 133, for secondary treatment. Grab samples shall continue to be collected once per day.

Total Suspended Solids (TSS) – Between January 2010 and December 2012, there were no exceedances of the TSS limitations. TSS is a technology-based requirement for municipal dischargers with secondary treatment required in accordance with 40 CFR Part 133. Effluent concentration limits of 30 mg/L monthly average and 45 mg/L weekly average have been continued. The loading limits have been revised to include only two significant figures. This change is in accordance with Guidance Memo 06-2016. Loading limits of 68 kg/d monthly average and 100 kg/d weekly average have been included in the permit.

The TSS data from the last three years during the permit term were evaluated to determine if the facility qualifies for a reduced monitoring frequency. In accordance with Guidance Memo 98-2005, the facility qualifies for a reduced monitoring frequency of 1/week. See **Attachment H** for a summary of the discharge data and a discussion of the criteria for reduced monitoring.

Biological Oxygen Demand (BOD₅), Dissolved Oxygen (DO) – Between January 2010 and December 2012, there were no exceedances of the BOD₅ limitations. The highest monthly average BOD₅ during this period was 7.08 mg/L. Since there has been a change in the flow frequencies at the outfall, the new data have been entered into the Regional Water Quality Model for Free Flowing Streams (Version 4.0) to reassess the BOD₅ limits. A copy of the model output results is found in **Attachment I**. An initial DO concentration of 5.9 mg/L, a TKN value of 15 mg/L, and 25 mg/L for BOD₅ were used in the model input. The model predicted a DO sag at the initial discharge point to 7.523 mg/L. The initial drop of 0.202 mg/L from the stream background is larger than the 0.20 mg/L drop allowed by antidegradation policy. As shown in the table below, when the initial DO concentration was increased to 5.5 mg/L and the BOD₅ was decreased to 24 mg/L, the model predicted a DO sag concentration of 7.525 mg/L. This initial drop of 0.200 mg/L from the baseline value equals the 0.20 mg/L drop allowed by antidegradation policy. So, a minimum DO limit of 5.5 mg/L has been included in the permit. Grab samples for DO shall be collected 1/day. BOD₅ limits of 24 mg/L (55 kg/d) monthly average and 36 mg/L (82 kg/d) weekly average have been included in the permit. The 303(e) Water Quality Management Plan established a loading limit of 63 kg/d when the plant was upgraded to 0.60 MGD (**Attachment E**). The monthly loading limit is more stringent than this Plan. The facility is also required to meet a minimum technology based requirement of 85 percent removal efficiency for BOD₅.

Discharge Data Input*			Model Output		
BOD ₅ (mg/L)	TKN (mg/L)	DO (mg/L)	DO Sag (mg/L)	DO Drop (mg/L)	Antidegradation Violated?
25	15	5.9	7.508	0.217	yes
18	15	5.4	7.516	0.209	yes
25	15	6.5	7.527	0.198	no
24	15	5.5	7.525	0.200	no

(*initial temperature conditions -- effluent 27.4 °C, stream 20.9 °C)
(background DO 7.725 mg/L)

The BOD₅ data from the last three years during the permit term were evaluated to determine if the facility qualifies for a reduced monitoring frequency. In accordance with Guidance Memo 98-2005, the facility qualifies for a reduced monitoring frequency of 1/week for BOD₅. See **Attachment H** for a summary of the discharge data and a discussion of the criteria for reduced monitoring.

Escherichia coli (*E. coli*) – The permittee submitted results for 12 *E. coli* samples collected in October 2003 through and August 2004. Chlorine contact data and effluent data were also submitted in conjunction with the *E. coli* data. The *E. coli* data ranged from <2 to 34 cfu/100 mL which is well below the water quality criteria for *E. coli*. The study results demonstrated compliance with *E. coli* criteria through chlorine disinfection.

A Total Daily Maximum Load (TMDL) report for the South Mayo River Watershed was approved by the EPA on June 22, 2006 and the State Water Control Board on February 27, 2004. This document included an *E. coli* wasteload allocation for the Town of Stuart WWTP of 1.04E+12 cfu/year. This WLA is equivalent to the facility discharging at its current design flow (0.60 MGD) and an *E. coli* limit of 126 cfu/100 mL. In accordance with the VPDES Permit Manual, an *E. coli* limit shall be included in permits that have approved TMDLs with wasteload allocations.

A monthly average limit of 126 cfu/100 mL (geometric mean) has been included in the permit as a means of verifying that the facility is complying with the TMDL wasteload allocation. One month out of the year samples (four weekly) will be collected to provide sufficient data to calculate a geometric mean.

In the event that the facility does not use chlorine disinfection, Part I.B of the permit requires 3 days/week *E. coli* monitoring. The definition of geometric mean given in the Water Quality Standards, 9 VAC 25-260-170 has recently been revised to indicate that the geometric mean "shall be calculated using all data collected during any calendar month with a minimum of four weekly samples. If there are insufficient data to calculate a monthly geometric mean..., no more than 10% of the total samples in the assessment period shall exceed 235 cfu/100 mL for *E. coli*. "

C. **Effluent Limitation Evaluation for Toxic Pollutants**

In addition to the standard limitations, the discharge must be evaluated to determine whether there is a reasonable potential for the effluent to violate the water quality standards (WQSs) adopted by the State Water Control Board (9 VAC 25-260 et. seq). Toxic pollutant data submitted with the application were above the quantification levels for bis (2-ethylhexyl) phthalate, ammonia, chloroform, dissolved copper, and dissolved zinc. These data are summarized in **Attachment F**. The water quality criteria and wasteload allocations (WLAs) for these parameters were calculated and are included in the spreadsheet in **Attachment G**.

In accordance with Guidance Memo 94-008, it is believed that bis (2-ethylhexyl) phthalate is probably introduced to the sample by plastic/rubber apparatus used in collecting or preparing the sample for analysis. Consequently, it is recommended that analysis results should be disregarded if the substance is found in minute amounts and there is no definable source. Minute amounts are defined as less than 30 µg/L. The data point was 5.9 µg/L. Therefore, the data has been disregarded, and no further evaluation is necessary.

The acute and chronic WLAs and a default ammonia concentration of 9.0 mg/L were used as input in the Agency's STATS program to determine if limits are necessary. The STATS program output indicates that limits are not needed for ammonia.

Chloroform has human health criteria based upon fish tissue. In accordance with DEQ Advice Memorandum dated January 10, 2001, human health parameters are assumed to be distributed similarly to other parameters and have the same relative variance (C.V. of about 0.6). The effluent data for chloroform and associated acute and chronic WLAs were used as input in the Agency's STATS program to determine if a limit is needed. The STATS program output indicates that a limit is not needed for chloroform.

The effluent data for dissolved copper and dissolved zinc and associated acute and chronic WLAs were used as input in the Agency's STATS program to determine if limits are necessary. The STATS program outputs indicate that limits are not needed for copper or zinc.

Temperature – Daily temperature monitoring is being required in the reissued permit. These data will be reported as a maximum daily average for the purposes of calculating the 90th percentile effluent temperature and calibrating the Regional Water Quality Model. The 90th percentile temperature is used in the wasteload allocation spreadsheet calculations. The temperature water quality criteria as per 9 VAC 25-260-50 for this Class IV receiving stream is 31 °C.

Total Residual Chlorine (TRC) – Between January 2010 and December 2012, there were no exceedances of the TRC limitations. The TRC limits in the previous permit were reassessed with the WLAs that were determined from revised temperature, pH, and stream flow frequencies. Based on the acute and chronic WLAs and the Agency's STATS program, permit limits of 0.060 mg/L monthly average and 0.067 mg/L weekly average are needed in the permit. These more stringent limits replace the previous permit limits. Since the facility dechlorinates the effluent, a compliance schedule is not needed to meet these limitations. Effluent TRC shall be monitored 3/ day at 4 hour intervals via grab samples.

17. **Basis for Sludge Use and Disposal Requirements:** Sewage sludge and land application site permit limitations and monitoring are required based on the VPDES Permit Regulation (9 VAC 25-31-10 et seq.) Part VI, Standards for the Use or Disposal of Sewage Sludge, and 40 CFR Part 503. Stuart WWTP is responsible for sludge use disposal (by land application) in accordance with their Sludge Management Plan (SMP), which is approved with this permit reissuance. A summary of the sludge quality from 2004 through 2010 is included in the **Attachment J**. The facility's biosolids meet the following treatment standards:

- The maximum monthly average pollutant concentration (PC) requirements in Table 3 of 9 VAC 25-31-540, Table 9 VAC 25-32-480, and Table 7 of 9 VAC-25-32-660.
- Class B pathogen reduction by aerobic digestion.

- Vector attraction reduction through a minimum 38 percent reduction in volatile solids.
- Alternative methods may be used, but must comply with 9 VAC 25-31-710 (Pathogen Reduction) and 9 VAC 25-31-720 (Vector Attraction Reduction).

18. **Antibacksliding Statement:** Since there are no limitations less stringent than the previous permit, the permit limits comply with the antibacksliding requirements of 9 VAC 25-31-220 L of the VPDES Permit Regulation.
19. **Compliance Schedules:** For this reissuance, no compliance schedules have been included.
20. **Special Conditions:** A brief rationale for each special condition contained in the permit is given below.

A. **Additional Total Residual Chlorine (TRC) Limitations and Monitoring Requirements (Part I.B)**

Rationale: This condition requires that the permittee monitor the TRC concentration after chlorine contact. In accordance with 40 CFR 122.41 (e) permittees are required, at all times, to properly operate and maintain all facilities and systems of treatment in order to comply with the permit. These requirements ensure proper operation of chlorination equipment to maintain adequate disinfection. It specifies *E. coli* limits when alternative disinfection methods are used. This condition is required by Sewerage Collection and Treatment Regulations, 9 VAC 25-790, bacteria standards.

B. **Compliance Reporting (Part I.C.1)**

Rationale: In accordance with VPDES Permit Regulation, 9 VAC 25-31-190 J4 and 220I, DEQ is authorized to establish monitoring methods and procedures to compile and analyze data on water quality, as per 40 CFR Part 130, Water Quality Planning and Management, Subpart 130.4. This condition is necessary when toxic pollutants are monitored by the permittee and a maximum level of quantification and/or specific analytical method is required in order to assess compliance with a permit limit or to compare effluent quality with a numeric criterion. This condition also establishes protocols for calculation of reported values.

C. **95% Capacity Reopener (Part I.C.2)**

Rationale: This condition requires that the permittee address problems resulting from high influent flows, in a timely fashion, to avoid non-compliance and water quality problems from plant overloading. This requirement is contained in 9 VAC 25-31-200 B4 of the VPDES Permit Regulations and applies to all POTWs and PVOTWs.

D. Indirect Dischargers (Part I.C.3)

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-200 B1 for POTWs and PVOTWs that receive waste from someone other than the owner of the treatment works.

E. CTC, CTO Requirement (Part I.C.4)

Rationale: This condition is required by Code of Virginia § 62.1-44.19 and Sewage Collection and Treatment Regulations, 9 VAC 25-790.

F. Operations and Maintenance Manual Requirement (Part I.C.5)

Rationale: An Operations and Maintenance Manual is required by the Code of Virginia § 62.1-44.19, the Sewage Collection and Treatment Regulations, 9 VAC 25-790; and the VPDES Permit Regulation, 9 VAC 25-31-190 E.

G. Licensed Operator Requirement (Part I.C.6)

Rationale: The VPDES Permit Regulation, 9 VAC 25-31-200 C, the Code of Virginia § 54.1-2300 et seq., and Rules and Regulations for Waterworks and Wastewater Works Operators (18 VAC 160-20-10 et seq.) require licensure of operators. A Class II operator is required by this facility.

H. Effluent Monitoring Frequencies (Part I.C.7)

Rationale: Permittees are granted a reduction in monitoring frequency based on a history of permit compliance. If facilities fail to maintain the previous levels of performance, then normal monitoring frequencies should be reinstated.

I. Reliability Class (Part I.C.8)

Rationale: A Reliability Class I has been assigned to this facility. Reliability class designations are required by Sewage Collection and Treatment Regulations, 9 VAC 25-790 for all municipal facilities.

J. Total Maximum Daily Load (TMDL) Reopener (Part I.C.9)

Rationale: Section 303(d) of the Clean Water Act requires that Total Maximum Daily Loads (TMDLs) be developed for streams listed as impaired. This special condition is to allow the permit to be reopened if necessary to bring it into compliance with any applicable TMDL approved for the receiving stream. The reopener recognizes that, according to Section 402(o)(1) of the Clean Water Act, limits and/or conditions may be either more or less stringent than those contained in this permit. Specifically, they can be

relaxed if they are the result of a TMDL, basin plan, or other wasteload allocation prepared under Section 303 of the Act.

K. Water Quality Criteria Monitoring (Part I.C.10)

Rationale: State Water Control Law § 62.1-44.21 authorizes the Board to request information needed to determine the discharge's impact on State waters. States are required to review data on discharges to identify actual or potential toxicity problems, or the attainment of water quality goals, according to 40 CFR Part 131, Water Quality Standards, Subpart 131.11. To ensure that water quality criteria are maintained, the permittee is required to analyze the facility's effluent for the substances noted in Attachment A of this VPDES permit.

Water quality criteria monitoring which include organics and metals required on Form 2A of the VPDES permit application. This monitoring is required to provide data needed to complete the next VPDES permit reissuance application. This special condition requires that these data be collected using quantification levels low enough to evaluate whether there is a potential to exceed wasteload allocations in the receiving stream. Laboratory data summary sheets and chain of custody sheets shall be submitted with Attachment A of the permit to document the laboratory methods used, practicable quantification levels, field collection, and preservation methods. Collection and reporting of these data prior to the due date for the VPDES permit application will provide adequate time to evaluate data and ensure that adequate data are provided to determine any limits are needed for the permit reissuance.

L. Treatment Works Closure Plan (Part I.C.11)

Rationale: In accordance with State Water Control Law § 62.1-44.19, this condition is used to notify the owner of the need for a closure plan where a treatment works is being replaced or is expected to close.

M. Permit Application Requirement (Part I.C.12)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100.D and 40 CFR 122.21(d)(1) require submission of a new application at least 180 days prior to expiration of the existing permit. In addition, the VPDES Permit Regulation, 9 VAC 25-31-100 E.1 and 40 CFR 122.21 (e)(1) note that a permit shall not be issued before receiving a complete application.

N. Sludge Management Plan (Part I.D.1)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-100 P; 220 B2; and 420 and 720, and 40 CFR Part 503 require all treatment works treating domestic sewage to submit information on sludge use and disposal practices and to meet specified standards for sludge use and disposal. Technical requirements may be derived from the VPA Permit

Regulation, 5 VAC 5-32-et seq. This special condition, in accordance with Guidance Memo No. 97-004, clarifies that the Sludge Management Plan approved with the reissuance of this permit is an enforceable condition of the permit.

O. Nutrient Management Plan (Part I.D.2)

Rationale: Water Control Law § 62.1-44.19.3.C.8 requires that a nutrient management plan (NMP) be developed by a person certified in accordance with § 10.1-104.2 for each biosolids land application site, prior to application of biosolids at the site. The statute also establishes conditions where the NMP must be approved by the Department of Conservation and Recreation prior to submittal at the time of permit application. VPA Regulation 9 VAC 25-32-680.A.2, with which all biosolids operations must comply, requires that the NMP be submitted to the farmer/operator of the site, the Department of Conservation and Recreation, and the local government, unless requested in writing to not receive the NMP.

P. Certified Land Applier Requirement (Part I.D.3)

Rationale: Water Control Law § 62.1-44.19.3.1.B. states that Class B biosolids shall not be land applied unless a certified land applicator is onsite at all times during the application.

Q. Monthly Activity Report (Part I.D.4)

Rationale: 9 VAC 25-32-440.B of the VPA Permit Regulation and Fee Regulation 9 VAC 25-20-147.B require submittal of a report by the 10th of the month following the month in which land application occurred. Specific information to be provided and maintenance requirements are identified in 9 VAC 25-20-147.A.

R. Land Application Fee (Part I.D.5)

Rationale: State Water Control Law § 62.1-44.19.3.P requires that a fee be charged to the generator of biosolids to be land applied in Virginia. The fee of \$7.50/dry ton of biosolids applied in the Commonwealth of Virginia is established by the Fee Regulation 9 VAC 25-20-146 and 9 VAC 25-20-40.A.3. Exemptions to the fee are provided in 9 VAC 25-20-50.C, and 9 VAC 20-60.D establishes the due date.

S. Annual Land Application Report (Part I.D.6)

Rationale: 9 VAC 25-31-590 of the VPDES Permit Regulation and 9 VAC 25-32-440.D of the VPA Permit Regulation require the submittal of certain permit requirements for the previous calendar year's activities on February 19 of each year.

T. Landowner Consent and Notice (Part I.D.7)

Rationale: 9 VAC 25-32-60.A.1.d of the VPA Permit Regulation requires the submission of landowner consent forms. 9 VAC 25-32-80.H.2 of the VPA Regulation requires the consent forms to be maintained for a minimum of 5 years or for the duration of the permit. 9 VAC 25-32-530.A of the VPA Regulation requires the permittee to maintain the agreement.

U. 100 Day Notification to the Locality (Part I.D.8)

Rationale: 9 VAC 25-31-485.C of the VPDES Permit Regulation and 9 VAC 25-32-510.F of the VPA Permit Regulation require notification to the locality 100 days prior to the initial land application at a specific site. Water Control Law § 62.1-44.19.3.K specifies that this rule does not apply to applications commenced prior to October 10, 2005.

V. 14 Day Notification Prior to Land Application (Part I.D.9)

Rationale: State Water Control Law § 62.1-44.19.3.L, 9 VAC 25-31-485.D of the VPDES Permit Regulation, and 9 VAC 25-32-510.H of the VPA Permit Regulation require notification to the Department 14 days prior to land application at a specific site.

W. Signage Requirements (Part I.D.10)

Rationale: 9 VAC 25-32-530.B of the VPA Permit Regulation requires that a sign be posted at a land application site at least 48 hours prior to delivery of biosolids at the site and remain on site until 48 hours after application is complete. 9 VAC 25-32-530.C-D of the VPA Permit Regulation specifies construction, content and maintenance of the sign.

X. Recordkeeping for PC and CPLR Biosolids (Part I.D.11)

Rationale: 9 VAC 25-31-580.A.1 and 4.b of the VPDES Permit Regulation and 9 VAC 25-32-80.H.2 of the VPA Permit Regulation require that specified biosolids documentation be maintained for at least 5 years.

Y. Recordkeeping for CPLR Biosolids (Part I.D.12)

Rationale: 9 VAC 25-31-580.A.5.b of the VPDES Permit Regulation and 9 VAC 32-80.H.2 of the VPA Permit Regulation require that specified biosolids documentation be maintained for at least 5 years.

Z. Reporting Land Application of Biosolids Upon Attaining 90% of CPLR (Part I.D.13)

Rationale: EPA 40 CFR Part 503.18(2), which applies to all biosolids applied in the USA, requires this reporting. 9 VAC 25-31-590.A.2 of the VPDES Permit Regulation states that information concerning 90% or more of any cumulative pollutant loading rates in Table 2 of 9 VAC 25-31-540 of the VPDES Permit Regulation is reached at a land application site is to be submitted on February 19 of each year for the calendar previous year's activity.

AA. CPLR Biosolids Tracking (Part I.D.14)

Rationale: 9 VAC 25-31-100.P.8.d(2) of the VPDES Permit Regulation requires biosolids from all sources and classifications to be accounted.

AB. Restrictions and Records for CPLR Biosolids Application to Sites Previously Used (Part I.D.15)

Rationale: 9 VAC 25-31-530.E.2 of the VPDES Permit Regulation establishes restrictions for application for previously used sites. 40 CFR Part 503.12(e)(2)(i –iv), which applies to all biosolids applied in the USA, establishes July 20, 1993 as the date to begin accounting for pollutant loading to soils.

AC. Sludge Reopener (Part I.E.1)

Rationale: This condition is required by VPDES Permit Regulation, 9 VAC 25-31-220 C for all permits issued to treatment works treating domestic sewage to allow incorporation of any applicable standard for biosolids use or disposal promulgated under Section 405(d) of the Clean Water Act . The permit may be pended when a change is made in the promulgated standards or regulations.

AD. Land Application Sites (Part I.E.2)

Rationale: 9 VAC 25-31-100.P of the VPDES Permit Regulation requires the submission of site information for the permit application. 9 VAC 25-32-340 of the VPA Permit Regulation states that no land application of biosolids shall occur except in compliance with a permit issued by the board authorizing the activity. Section 340 refers to the submission of specific forms in Article 4 (9VAC25-32-670 et seq.) required for permit application. The Sludge Management Plan (SMP) shall include a list of all sites presented in the application and approved with the issuance of the permit, with basic contact and location information provided in the permit application.

AE. Restrictions on CPLR Biosolids Application (Part I.E.3)

Rationale: 9 VAC 25-31-530.B of the VPDES Permit Regulation and 9 VAC 25-32-640 of the VPA Permit Regulation establish maximum cumulative pollutant loading of trace elements on soils.

AF. Loading Rates (Part I.E.4)

Rationale: 9 VAC 25-31-505.A - Site specific nutrient management plans and the cumulative trace element loading rates (9 VAC-25-31-540B Table 2). 9 VAC 25-31-220.I.4.a states that mass or other measurements for each pollutant of concern may be specified in the VPDES Permit. 9 VAC 25-31-220.I.4.c of the VPDES Permit Regulation allows for other measurements as appropriate. In accordance with 9 VAC 25-31-540B (Table 3), biosolids application rates shall be restricted by pollutant loading. 9 VAC 25-32-560.B.3.a of the VPA Permit Regulation, requires that site specific application rates be proposed using pertinent biosolids plant available nitrogen (PAN) and crop nutrient needs (agronomic rate listed in Table 10) and the cumulative trace element loading rates (Table 8),

AG. Infrequent Land Application Restrictions (Part I.E.5)

Rationale: 9 VAC 25-32-560.B.3.a(1) of the VPA Permit Regulation specifies requirements for infrequent application.

AH. Frequent Land Application Restrictions (Part I.E.6)

Rationale: 9 VAC 25-32-560.B.3.a(5) of the VPDES Permit Regulation specifies requirements for frequent application below agronomic rate application.

AI. Threatened or Endangered Species (Part I.F.1)

Rationale: In accordance with 9 VAC 25-31-550 of the VPDES Permit Regulation and 9 VAC 25-32-530 of the VPA Permit Regulation, sewage sludge shall not be applied to land if it is likely to adversely affect a threatened or endangered species.

AJ. Liquid Application Rate Limitation (Part I.F.2)

Rationale: 9 VAC 25-32-560.B.3.c(1) specifies requirements for application of liquid biosolids.

AK. Operational Limitations During Periods of Inclement Weather (Part I.F.3)

Rationale: 9 VAC 25-31-550.B of the VPDES Permit Regulation and 9 VAC 25-32-560.B.3.c (2) of the VPA Permit Regulation specify requirements for application during inclement weather.

AL. Injection or Incorporation Requirement (Part I.F.4)

Rationale: 9 VAC 25-32-560.B.3.b of the VPA Permit Regulation requires direct injection or incorporation within 48 hours of application on sites with less than 60% uniform residue cover or at times when the site is subject to frequent flooding as defined by soil survey information.

AM. Slope Restrictions (Part I.F.5)

Rationale: 9 VAC 25-32-560.B.3.b-c of the VPA Permit Regulation specifies maximum slope restrictions and management practices to follow when applying on field with slopes between 5% and 15%. 9 VAC 25-31-460.C of the VPDES Permit Regulation indicates that site-specific conditions can justify requirements concerning slope and other factors.

AN. Transport Vehicles (Part I.F.6)

Rationale: 9 VAC 25-32-540.A of the VPA Permit Regulation requires that vehicles transporting biosolids be sealed and watertight if carrying liquid biosolids.

AO. Buffer Zones (Part I.F.7)

Rationale: 9 VAC 25-32-560.B.3.d (1) of the VPA Permit Regulation establishes setback distances. 9 VAC 25-32-560.B.3.d(2) of the VPA Permit Regulation allows extension of buffer zones to 400 feet or more from occupied dwellings under certain conditions. 9 VAC 25-32-100-6 of the VPA Permit Regulation allows for site-specific conditions and 9 VAC 25-32-490 allows standards and requirements more stringent than in the VPA regulation. 9 VAC 25-31-505.D of the VPA Permit Regulation indicates that site-specific conditions can justify extended setback distances.

AP. Cadmium and Soil pH (Part I.F.8)

Rationale: 9 VAC 25-32-560.B.2 of the VPA Permit Regulation requires that the biosolids/soil mixture have a final pH of 6.0 S.U. or greater if the soil cadmium concentration is greater than 21 mg/kg.

AQ. Site Restrictions for Land Application of Class B Biosolids (Part I.F.9)

Rationale: Sewage sludge and land application site permit limitations and monitoring are required based on VPDES Permit Regulation, 9 VAC 25-31-710.B.5, and 40 CFR Part 503.

AR. Biosolids Storage Requirements (Part I.F.10)

Rationale: 9 VAC 25-31-505.E of the VPDES Permit Regulation requires compliance with State Water Control Law § 62.1-44.19:3 R. 9 VAC 25-32-550.B and C of the VPA Permit

Regulation defines emergency storage and establish general requirements; and 9 VAC 25-32-550.B and D.1-7 define temporary storage and establish requirements.

AS. Pretreatment (Part I.G)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-730 through 900, and 40 CFR Part 403 require certain existing and new sources of pollution to meet specified regulations.

AT. Toxics Management Program (Part I.H)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-210 and 220 I, requires monitoring in the permit to provide for and assure compliance with all applicable requirements of the State Water Control Law and the Clean Water Act. This requirement is included because the facility has a pretreatment program. See **Attachment K** for the Toxics Management Program Justification Memo.

AU. Conditions Applicable to All VPDES Permits (Part II)

Rationale: VPDES Permit Regulation, 9 VAC 25-31-190 requires all VPDES permits to contain or specifically cite the conditions listed.

21. Changes to the Permit:

A. The following special condition has been deleted from the permit:

1. The Additional Land Application Sites Special Condition (Part I.D.9) has been removed because this information is already included with the Sludge Management Plan Special Condition (Part I.D.1) and the Land Application Sites Special Condition (Part I.E.2).
2. The Planting Schedule Following Biosolids Application (Part I.D.10) has been removed because this information is required in the Nutrient Management Plan.

B. Special conditions that have been modified from the previous permit are listed below: (The referenced permit sections are for the new permit.)

1. The Additional Total Residual Chlorine Limitations and Monitoring Requirements Special Condition (Part I.B) has been revised to reflect changes in the Water Quality Standards.
2. The Compliance Reporting Special Condition (Part I.C.1) has been modified to include information about significant figures.
3. The Operations and Maintenance Manual Special Condition (Part I.C.5) has been revised to reflect current VPDES Permit Manual recommendations.

4. The Water Quality Criteria Monitoring Special Condition (Part I.C.9) has been revised to remove pesticides that have already been tested and add additional parameters required on Form 2A for the next reissuance.
5. The Nutrient Management Plan Special Condition (Part I.D.2) has been revised to no longer require approval by DEQ or DCR.
6. The Monthly Activity Report Special Condition (Part I.D.4) has been revised to with a different due date for the report and a requirement for submission to DEQ's Office of Land Application. Biosolids load reporting also required.
7. The Annual Land Application Report Special Condition (Part I.D.6) has been revised to include more report details which include storage capacity and land application site land application activity.
8. The Landowner Consent and Notice Special Condition (Part I.D.7) has been revised to include landowner notification requirements and provide notice and necessary information forms in Attachment B of the permit as explained in Guidance Memo 12-2003.
9. The Transport Vehicles Special Condition (Part I.F.6) has been revised to remove information about spill cleanup because this information is included in Part II.G of the permit.
10. The Toxics Management Program Special Condition (Part I.H) has been revised to only require one species in accordance with Guidance Memo 00-2012.

C. New special conditions added to the permit are listed below:

1. An Effluent Monitoring Frequencies Special Condition (Part I.C.7) has been to require that the permittee's reduced monitoring frequencies revert back to the previous frequencies if they are issued a Notice of Violation for any of the parameters with reduced monitoring.
2. A Permit Application Requirement Special Condition (Part I.C.11) has been added to remind the permittee of the requirement to submit a reissuance.
3. In accordance with the VPDES Permit Regulation, a 100 Day Notification to the Locality Special Condition (Part I.D.8) has been added.
4. A Recordkeeping for CPLR Biosolids Special Condition (Part I.D.12) has been added to provide reporting requirements for sludge that is subject to CPLR requirements.

5. A Reporting Land Application of Biosolids Upon Attaining 90% of CPLR Special Condition (Part I.D.13) has been added to provide criteria for when CPLR reporting is required.
6. A CPLR Biosolids Tracking Special Condition (Part I.D.14) to include tracking requirements for CPLR sludge.
7. A Restrictions and Records for CPLR Biosolids Application to Sites Previously Used Special Condition (Part I.D.15) has been added to describe cumulative loading tracking for sites that have previously received biosolids.
8. A Land Application Sites Special Condition (Part I.E.2) has been added to clarify that land application is restricted to the sites identified in the Sludge Management Plan.
9. A Restrictions for CPLR Biosolids Application Special Condition (Part I.E.3) has been added to note that if the cumulative pollutant loading rates are met, land application is no allowed.
10. A Loading Rates Special Condition (Part I.E.4) has been added to describe loading rate calculations for determining application rates.
11. An Infrequent Land Application Restrictions Special Condition (Part I.E.5) has been added to provide restrictions for sites where biosolids are land applied infrequently.
12. A Frequent Land Application Restrictions Special Condition (Part I.E.6) has been added to provide restrictions for sites where biosolids are land applied frequently.
13. A Liquid Application Rate Limitation Special Condition (Part I.F.2) has been added to include hydraulic loading rate restrictions.
14. An Operational Limitations During Periods of Inclement Weather Special Condition (Part I.F.3) has been added to restrict biosolids to frozen ground or ground covered with snow or ice.
15. An Injection or Incorporation Requirement Special Condition (Part I.F.4) has been added to prevent runoff of biosolids.
16. In accordance with the current VPDES permit regulations, a Buffer Zones Special Condition (Part I.F.7) has been added.
17. A Cadmium and Soil pH Special Condition (Part I.F.8) has been added to require the addition of limit for biosolids with a pH below 6.0 S.U. with a cadmium concentration greater than 21 mg/kg.

18. In accordance with the VPDES Permit Regulations, a Biosolids Storage Requirements Special Condition (Part I.F.10) has been added.

D. **Permit Limits and Monitoring Requirements:** See **Table III** on pages 29-30 for details on changes to the effluent limits and monitoring requirements.

22. **Variances/Alternate Limits or Conditions:** No variances or alternate limits or conditions are included in this permit. The permittee requested that 8-hour composite analysis data for TSS and BOD₅ collected during the permit term be used in the application in lieu of composite samples. Waivers were also requested for parameters without water quality criteria. These waivers were consistent with current permit requirements, and therefore they were granted.
23. **Regulation of Treatment Works Users:** The VPDES Permit Regulation, 9 VAC 25-31-280 B9, requires that every permit issued to a treatment works owned by a person other than a state or municipality provide an explanation of the Board's decision on the regulation of users. The Town of Stuart, a municipality, owns this treatment works; therefore, this regulation does not apply. The Significant Industrial Survey required for the facility's industrial users is in Part I.G of the permit.
24. **Public Notice Information required by 9 VAC 25-31-290D:**

All pertinent information is on file and may be inspected, and copied by contacting Becky L. France at:

Virginia DEQ
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, VA 24019
540-562-6700
becky.france@deq.virginia.gov

Persons may comment in writing or by e-mail to the DEQ on the proposed permit action and may request a public hearing during the comment period. Comments shall include the name, address, and telephone number of the writer and of all persons represented by the commenter/requester, and shall contain a complete, concise statement of the factual basis for the comments. Only those comments received within this period will be considered.

The DEQ may decide to hold a public hearing, including another comment period, if public response is significant and there are substantial, disputed issues relevant to the permit. Requests for public hearings shall state (1) the reason why a hearing is requested; (2) a brief informal statement regarding the nature and extent of the interest of the requester or of those represented by the requester, including how and to what extent such interest would be directly and adversely affected by the permit; and (3) specific references, where possible, to terms and conditions of the permit with suggested revisions. Following the comment period, the Board will make a determination regarding the proposed permit action. This determination will become effective,

unless the DEQ grants a public hearing. Due notice of any public hearing will be given. The public may review the draft permit and application at the Blue Ridge Regional Office in Roanoke by appointment. A copy of the public notice is found in **Attachment L**.

25. **303(d) Listed Segments (TMDL):** This facility discharges to the South Mayo River. The stream receiving the effluent is listed as impaired for temperature and *E. coli* on the current 303(d) list. An *E. coli* Total Maximum Daily Load (TMDL) has been developed for the South Mayo River. The 5.77 mile impaired segment of the South Mayo River (L43R-01-BAC) extends from the confluence with Russell Creek downstream to the confluence of Spoon Creek. A TMDL report for this segment was approved by the EPA on February 27, 2004 and the State Water Control Board on June 17, 2004. It contains a wasteload allocation (WLA) for this discharge of 1.04E +12. This WLA is based on a design flow of 0.60 MGD and an *E. coli* limit of 126 cfu/100 mL. This permit has an *E. coli* limit of 126 cfu/100 mL (geometric mean) that is in compliance with the TMDL.

26. **Additional Comments:**

- A. **Reduced Effluent Monitoring:** In accordance with Guidance Memo 98-2005, all permit applications received after May 4, 1998, are considered for reduction in effluent monitoring frequency. Only facilities having exemplary operations that consistently meet permit requirements may qualify for reduced monitoring. To qualify for consideration of reduced monitoring requirements, the facility should not have been issued any Warning Letters, Notices of Unsatisfactory Laboratory Compliance, Letter of Noncompliance (LON) or Notices of Violation (NOV), or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

The facility received the following Warning Letters within the past three years:

Warning Letter No. W2013-01-W-1001	failure to submit annual sludge report
Warning Letter No. W2012-04-W-1001	failure to submit annual TMP report

The permittee did not land apply sludge during 2012 and the permittee failed to notify DEQ that no land application data was required. This administrative omission does not reflect on the operation of the treatment facility. The permittee completed the toxicity testing and monitoring report according to the required deadlines in the permit. The warning letter was issued because a copy of this report was not found in the DEQ file. These corrected issues do not reflect upon the performance of the treatment facility. Therefore, these warning letters have not been used as a basis for disqualifying the facility from a reduced monitoring data evaluation. Refer to **Attachment H** for a summary of the effluent data and reduced monitoring data evaluation.

- B. **Regulation of Storm Water Discharges:** VPDES Permit Regulation 9 VAC 25-31-10 defines discharges of storm water from municipal treatment plants with designed flow of 1.0 MGD or more, or plants with approved pretreatment programs, as discharges of storm

water associated with industrial activity subject to permitting requirements. Stuart WWTP has an approved pretreatment program. However, the facility has submitted a no exposure form certifying that any storm water discharges are not exposed to industrial activity. Thus, industrial storm water requirements have not been incorporated into the permit.

C. **Previous Board Action:** None

- D. **Staff Comments:** The discharge is not controversial. The discharge is in conformance with the existing planning document for the area. The permit is being reissued for a period of less than five years to even out the DEQ staff permit writing workload.

The #14 Antidegradation Review and Comments section of this Fact Sheet was revised on April 19, 2013 to clarify applicability of the antidegradation criteria. This revision did not result in any changes to the limits or monitoring requirements. A statement was also added to Part I.A of the permit noting that biosolids and soil monitoring are only applicable if the permittee land applies biosolids.

- E. **Public Comments:** The Virginia Department of Game and Inland Fisheries (VDGIF) commented on the permit reissuance. They recommended that the treatment for the discharge be upgraded to ultraviolet or ozone disinfection alternatives. Since the facility has dechlorination following chlorination, an alternative disinfection method was not deemed necessary. See **Attachment E** for a copy of the VDGIF comments.

The U.S. Fish and Wildlife Service requested an increase in buffer zones for land application sites to protect downstream endangered species habitat. Agency Guidance notes that buffer zones may be increased due to site specific conditions at land application sites. In this case, there are no unusual site specific conditions that would justify an increase in the buffer zones. Therefore, no changes have been made in the buffer zones.

F. **Tables:**

Table I	Discharge Description (Page 2)
Tables II-V	Basis for Monitoring Requirements (Pages 23-28)
Table VI	Permit Processing Change Sheet (Pages 29-30)

G. **Attachments:**

- A. Flow Frequency Information
- B. Wastewater Schematics
- C. Site Inspection Report
- D. USGS Topographic Map
- E. Ambient Water Quality Information
 - STORET Data (Station 4ASMR033.98)
 - Bacteria TMDL for South Mayo River (Excerpt)

- 2010 Impaired Waters Summary Report (Excerpt)
- Roanoke River Basin Comprehensive Water Resources Plan (Excerpt)
- Endangered Species Information
- F. Effluent Data
- G. Wasteload and Limit Calculations
 - Mixing Zone Output (MIXER)
 - Wasteload Allocation Spreadsheet
 - STATS Program Results
- H. Reduced Monitoring Evaluation Memorandum
- I. Regional Water Quality Model
- J. Biosolids Data
- K. Toxics Management Program Justification Memorandum
- L. Public Notice, Public Comments, and Response to Comments
- M. EPA Checksheet

Table II
 BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
 (x) Final Limitations

OUTFALL: 001
 DESIGN CAPACITY: 0.60 MGD

Effective Dates - From: Effective Date
 To: Expiration Date

PARAMETER	BASIS FOR LIMITS	DISCHARGE LIMITS				MONITORING REQUIREMENTS	
		Monthly Average	Weekly Average	Minimum	Maximum	Frequency	Sample Type
Flow (MGD)	NA	NL	NA	NA	NL	Continuous	TIRE
pH (Standard Units)	1,2	NA	NA	6.0	9.0	1/Day	Grab
BOD ₅	3,4	24 mg/L 55 kg/d	36 mg/L 82 kg/d	NA	NA	1/Week	8 HC
Total Suspended Solids	1	30 mg/L 68 kg/d	45 mg/L 100 kg/d	NA	NA	1/Week	8 HC
Temperature	2	NA	NA	NA	NL °C	1/Day	Grab
Total Residual Chlorine	2	0.060 mg/L	0.067 mg/L	NA	NA	3/Day at 4-hour intervals	Grab
Dissolved Oxygen	2,4	NA	NA	5.5 mg/L	NA	1/Day	Grab
<i>E. coli</i>	2,5	126 cfu /100 mL (Geometric Mean)	NA	NA	NA	1/Year*	Grab

NA = Not Applicable

NL = No Limitations; monitoring only

8HC= 8 hour composite

TIRE = totalizing, indicating, recording equipment

*Calculate geometric mean with 4 weekly samples collected in one month, between 10 am and 4 pm

The basis for the limitations codes are:

1. Federal Technology-Based Secondary Treatment Regulation (40 CFR Part 133)
2. Water Quality Criteria
3. Roanoke River Water Quality Management Plan
4. Regional Water Quality Model
5. South Mayo River TMDL

Table III
BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
(x) Final Limitations

Final Biosolids Product Prior to Land Application
DESIGN CAPACITY: 0.60 MGD

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASIS FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		Monthly Average	Maximum	Frequency	Sample Type
Percent Solids (%)	1	NL	NA	1/Year	Composite
Total Arsenic (mg/kg)	2	41	75	1/Year	Composite
Total Cadmium (mg/kg)	2	39	85	1/Year	Composite
Total Copper (mg/kg)	2	1,500	4,300	1/Year	Composite
Total Lead (mg/kg)	2	300	840	1/Year	Composite
Total Mercury (mg/kg)	2	17	57	1/Year	Composite
Total Molybdenum (mg/kg)	2	NA	75	1/Year	Composite
Total Nickel (mg/kg)	2	420	420	1/Year	Composite
Total Selenium (mg/kg)	2	100	100	1/Year	Composite
Total Zinc (mg/kg)	2	2,800	7,500	1/Year	Composite
TKN (mg/kg)	1	NL	NA	1/Year	Composite
Ammonium Nitrogen (mg/kg)	1	NL	NA	1/Year	Composite
Nitrate Nitrogen (mg/kg)	1	NL	NA	1/Year	Composite
Total Phosphorus (mg/kg)	1	NL	NA	1/Year	Composite
Total Potassium (mg/kg)	1	NL	NA	1/Year	Composite
pH (Standard Units at 25 °C)	1	NL	NA	1/Year	Composite
Alkalinity, CCE as CaCO ₃ (%)	1	NL	NA	1/Year	Composite

NA = Not Applicable

NL = No Limitations; monitoring only

The basis for the limitations codes are:

1. 9 VAC 25-31-490, 560, 570; 9 VAC 25-32-440, 450, 480 Tables 2 & 3
2. 9 VAC 25-31-490, 540 Tables 1 & 3, 560, 570; 9 VAC 25-32-440, 450, 480 Tables 2 & 3, 660 Tables 7A & B

Table IV
BASIS FOR LIMITATIONS – MUNICIPAL

() Interim Limitations
(x) Final Limitations

Land Application Fields Where Biosolids Subject to CPLRs Land Applied
DESIGN CAPACITY: 0.60 MGD

Effective Dates - From: Effective Date
To: Expiration Date

PARAMETER	BASES FOR LIMITS	LIMITATIONS		MONITORING REQUIREMENTS	
		CPLR*		Frequency	Sample Type
		(kg/ha)	(lb/A)		
Total Arsenic	1	41	36	Each Application	Calculated
Total Cadmium	1	39	35	Each Application	Calculated
Total Copper	1	1,500	1,340	Each Application	Calculated
Total Lead	1	300	270	Each Application	Calculated
Total Mercury	1	17	16	Each Application	Calculated
Total Molybdenum	NA	NA	NA	Each Application	Calculated
Total Nickel	1	420	375	Each Application	Calculated
Total Selenium	1	100	89	Each Application	Calculated
Total Zinc	1	2,800	2,500	Each Application	Calculated

NA = Not Applicable CPLR = Ceiling Pollutant Loading Rates

Bases for Effluent Limitations: 1. 9 VAC 25-31-540 Table 2; 9 VAC 25-32-660 Table 8

Table V
BASIS FOR LIMITATIONS – MUNICIPAL

Soil Monitoring

All Land Application Sites Before Sludge Applied

DESIGN CAPACITY: 0.60 MGD

Effective Dates - From: Effective Date

To: Expiration Date

() Interim Limitations

(x) Final Limitations

PARAMETER	BASES FOR LIMITS	LIMITATIONS	MONITORING REQUIREMENTS	
			Frequency***	Sample Type
Soil pH (SU)	1	NL*	1/ 3 Years	Composite
Cation Exchange Capacity (meq/100 g)	1	NL	1/ 3 Years	Composite
Available Phosphorus (mg/kg)	1	NL**	1/ 3 Years	Composite
Exchangeable Potassium (mg/kg)	1	NL	1/ 3 Years	Composite
Exchangeable Magnesium (mg/kg)	1	NL	1/ 3 Years	Composite

NL = No Limitation, monitoring required

* = 9 VAC 25-32-560.B.3.a Lime amended biosolids shall be applied at rates that are not expected to result in a target soil pH in the plow layer above a pH of 6.5 for soils located in the coastal plain and above a pH of 6.8 in other areas of the state.

** = 9 VAC 25-32-660 If soils exhibit very high soil test phosphorus of 55 or more parts per million phosphorus (Mehlich I analytical test procedure or equivalent procedure approved by the Department of Conservation and Recreation), the maximum application rates for phosphorus contained in biosolids together with phosphorus contained in other applied nutrient sources to the site and all applicable phosphorus management practices shall be consistent with the nutrient management plan (prepared by a certified nutrient management planner as stipulated in regulations promulgated pursuant to §10.1-104.2 of the Code of Virginia).

*** = 9 VAC 25-32-560.B.2 Prior to biosolids application - For biosolids with a cadmium concentration greater than or equal to 21 mg/kg the soil pH sample must be less than 1 year old. Prior to biosolids application - Soil samples shall be collected and analyzed no more than 3 years prior to the application

Bases for Effluent Limitations: 1. 9 VAC 25-32-460, 480 Table 5

Table VI-1
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
001	Total Residual Chlorine	1/Day	3/Day at 4 hour intervals	0.069 mg/L monthly average and 0.084 mg/L weekly average	0.060 mg/L monthly average and 0.067 mg/L weekly average	STATS program determined that more stringent limits were needed to protect water quality of the receiving stream. The monitoring frequency increased in accordance with VPDES Permit Manual.	2/27/13
001	<i>E. coli</i> (applicable if TRC is used for disinfection)	NA	1/Year (1/Week for 4 weeks)	NA	126 cfu/100 mL (geometric mean) based on 4 weekly samples	Monitoring and limit needed to demonstrate compliance with bacteria TMDL wasteload allocation for this facility.	2/27/13
001	<i>E. coli</i> (applicable only if TRC not used for disinfection)	1/Week	3 Days/Week	126 N/100 ml (geometric mean)	126 cfu/100 mL (geometric mean or 235 cfu/100 mL maximum	Water quality standards revised to require geometric mean to be calculated from 4 samples. Alternative maximum limit applies when less than 4 samples collected during the month. Monitoring frequency increased in accordance with VPDES Permit Manual. In accordance with the VPDES Permit Manual, the frequency has increased.	2/27/13
001	BOD ₅	3 Days/Week	1/Week	28 mg/L (63 kg/d) monthly average; 42 mg/L (95 kg/d) weekly average	24 mg/L (54 kg/d) monthly average; 36 mg/L (82 kg/d) weekly average	Monitoring data supports a reduced monitoring frequency of 1/week. New temperature data were input into the Regional DO model. The model output indicated a more stringent BOD ₅ monthly average limit is needed to prevent a significant decrease in dissolved oxygen in the receiving stream.	2/27/13
001	TSS	3 Days/Week	1/Week	30 mg/L (68 kg/d) monthly average; 45 mg/L (102 kg/d) weekly average	30 mg/L (68 kg/d) monthly average; 45 mg/L (100 kg/d) weekly average	Monitoring data supports a reduced monitoring frequency of 1/week. In accordance with Guidance Memo 98-2005, significant figures reduced to two.	2/27/13
011	Dissolved Oxygen	NA	1/Day	NA	5.5 mg/L	Monitoring data supports a reduced monitoring frequency of 1/week. New temperature data were input into the Regional DO model. The model output indicated a minimum DO limit needed.	2/27/13

Table VI-2
PERMIT PROCESSING CHANGE SHEET

LIMITS AND MONITORING SCHEDULE:

Outfall No.	Parameter Changed	Monitoring Requirement Changed		Effluent Limits Changed		Reason for Change	Date
		From	To	From	To		
Biosolids	Arsenic, Total			NA	41 kg/ha maximum, 36 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs (Cumulative Pollutant Loading Rates).	2/27/13
Biosolids	Cadmium, Total			NA	39 kg/ha maximum, 35 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Copper, Total			NA	1,500 kg/ha maximum, 1,340 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Lead, Total			NA	300 kg/ha maximum, 270 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Mercury, Total			NA	17 kg/ha maximum, 16 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Nickel, Total			NA	420 kg/ha maximum, 375 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Selenium, Total			NA	17 kg/ha maximum, 16 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13
Biosolids	Zinc, Total			NA	2,800 kg/ha maximum, 2,500 lb/acre maximum	Limits only applicable if biosolids subject to CPLRs.	2/27/13

Attachment A

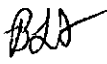
Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION
3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Town of Stuart WWTP – Reissuance (VA0022985)

TO: Permit File

FROM: Becky L. France, Water Permit Writer 

DATE: January 23, 2013

The Town of Stuart WWTP to the South Mayo River near Stuart, Virginia. Stream flow frequencies are required at this site for use in developing effluent limitations for the VPDES permit.

The USGS has operated a continuous record gauge on the South Mayo River near Nettleridge, Virginia (#02069700) since 1963. The gauge is located at the Route 700 bridge near Nettleridge, Virginia 14.69 river miles downstream of the discharge point. The flow frequencies for the gauge are based on the period from 1963 through 2011. The values at the discharge point were determined by drainage area proportions. The design flow of 0.60 MGD from the Town of Stuart WWTP was subtracted from the resulting flows to calculate the flow upstream of outfall 001.

The high flow months are January through June. Flow frequencies are listed on the attached table.

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The high flow months are January through June. Flow frequencies are listed on the attached table.

Flow Frequency Determination: Town of Stuart WWTP

Reference Gauge (data from 1963 to 2003)					
South Mayo River near Nettleridge, VA(#02069700)					
Drainage Area [mi ²] =		85.5			
	ft ³ /s	MGD		ft ³ /s	MGD
1Q10 =	22.3	14.4	High Flow 1Q10 =	35	23
7Q10 =	24.5	15.8	High Flow 7Q10 =	39	25
30Q5 =	37.5	24.2	HM =	82	53
30Q10=	30.9	20.0	High Flow 3010=	50	32

Town of Stuart WWTP design flow 0.6 MGD

Flow frequencies for the reissued permit (7/5/2013)					
Roanoke River at Discharge Point					
Drainage Area [mi ²] =		34.9			
	ft ³ /s	MGD		ft ³ /s	MGD
1Q10 =	9	5.5	High Flow 1Q10 =	14	8.8
7Q10 =	9.4	6.1	High Flow 7Q10 =	15	10
30Q5 =	14.7	9.5	HM =	33	21
30Q10=	12.0	7.8	High Flow 30Q10=	20	13

Flow Frequency Determination Memorandum
Page 3 of 3

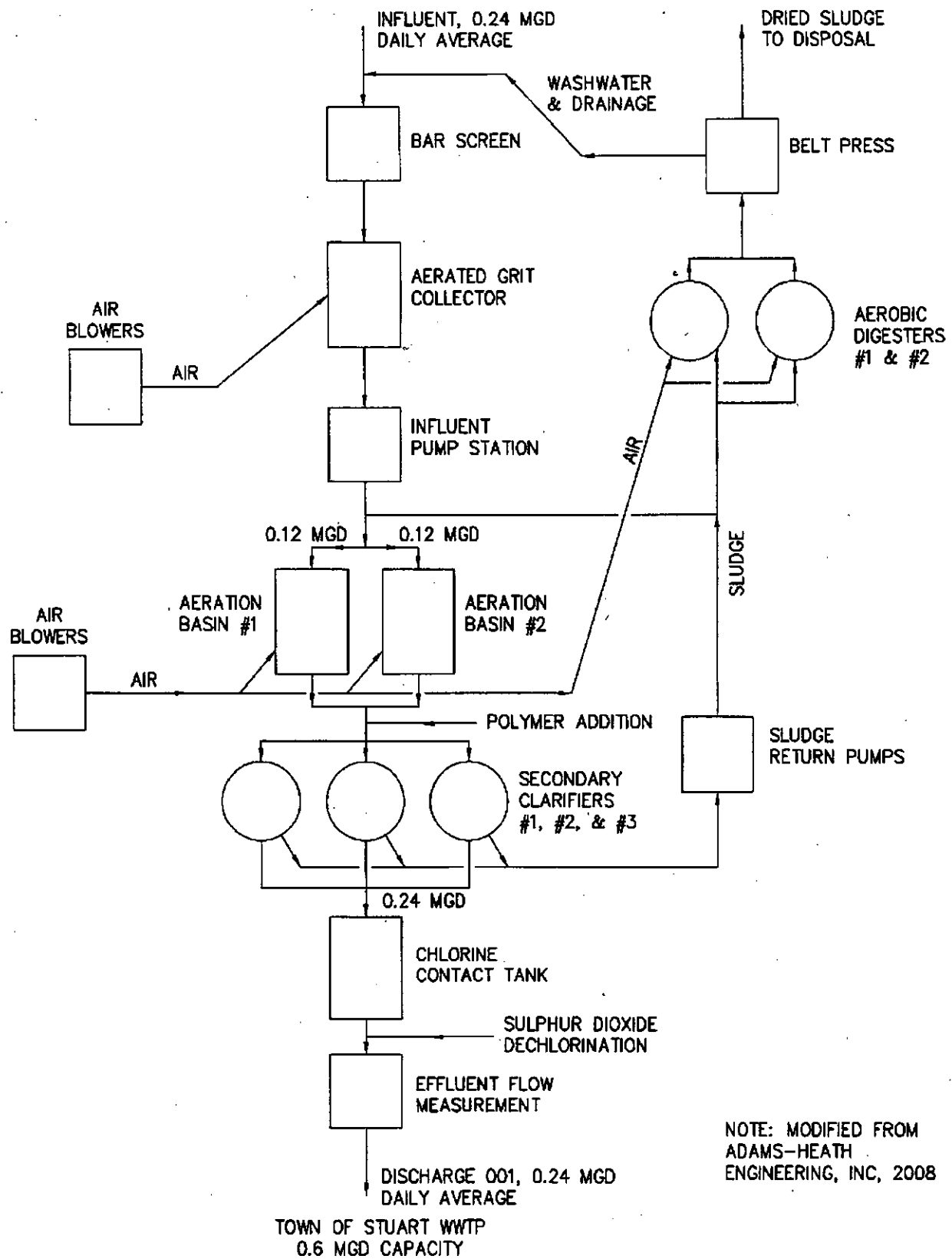
Gauge No. 02069700
Lat 36 34'15", Long 80 07'46", NAD 83
South Mayo River near Nettleridge, Va.
Nettleridge Quad (Patrick County)

Record-	DAArea	Harmean	HF30Q10	HF7Q10	HF1Q10	Z30Q5	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HFmths	StatPeriod	Yrstrm
R, 1963-	84.6	82	50	39	35	37.5	30.9	24.5	22.3	15	JAN- JUN	1963-2011	2005

Attachment B

Wastewater Schematics

File: V:\PROJECTS\BVA\24794\CADD\FIGURES\FIGURE 1.DWG Saved: 12/12/2012 11:18:29 AM User: Hodges, Chris LastSavedBy: 3771
 Plotted: 12/12/2012 11:16:48 AM



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CHA
 1901 Innovation Drive, Suite 2100
 Blacksburg, VA 24060
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TOWN OF STUART WWTP TREATMENT SCHEMATIC

VPDES PERMIT APPLICATION

PROJECT NO.
24794

DATE: DEC 2012

FIGURE 2

Attachment C

Site Inspection Report

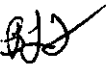
M E M O R A N D U M
DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Site Inspection Report for Town of Stuart WWTP
Reissuance of VPDES Permit No. VA0022985

TO: Permit File

FROM: Becky L. France, Water Permit Writer 

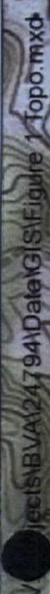
DATE: October 24, 2012

On October 24, 2012, I conducted a site inspection of the Stuart WWTP which is located in the Town of Stuart. Andrew Dalton, Class II operator, and Jeff Hart, Class III operator and pretreatment coordinator were present at the inspection.

The facility is a 0.60 MGD extended aeration activated sludge treatment facility. Because there are two Significant Industrial Users, an elastic fabrics manufacturer (United Elastic) and an engraved plate manufacturer (Rotometrics), the facility operates a conditional pretreatment program. The facility's treatment system consists of screening, activated sludge aeration, secondary clarification, chlorine disinfection, dechlorination, sludge digestion, and thickening. The flow is measured at a 6-inch parshall flume with ultrasonic meter. At the time of the site visit, the flow was 187.5 gpm. Chlorine gas, sulfur dioxide gas, polymer, and lime are stored onsite in buildings.

Wastewater flows through a mechanically cleaned bar screen into an aerated grit chamber. Currently, this mechanical grit collection system is out of service due to a broken sprocket. Grit is removed to a sump for dewatering. A drain located around the grit chamber drains any contaminated storm water to the treatment works. From the grit chamber, the wastewater is pumped to two parallel aeration basins. There are two blowers that are operated constantly for the aeration basins. There is a third backup blower not in service. At the time of the site visit, the wastewater in the aeration basins was a very dark brown color probably due to the influent from industrial dischargers. The wastewater from the aeration basins flows into three 26,000 gallon parallel secondary clarifiers. At the time of the site visit, there was some foam in the secondary clarifiers. One of the secondary clarifiers contained a great deal of scum and floating solids, and this clarifier was awaiting a scheduled servicing. Sludge from the clarifiers is routed to two digesters. From the secondary clarifiers, the wastewater overflows the weirs, and chlorine gas is added as it enters the baffled chlorine contact basin. Chlorine gas and sulfur dioxide gas are stored in separate buildings in 150 pound cylinders. There were six full chlorine gas cylinders and one online. There were 6 full sulfur dioxide cylinders and one online. At the time of the site visit, there was a small amount of leaf material and debris near the end of the contact basin. The wastewater is dechlorinated with sulfur dioxide prior to discharge through an eight inch cast iron pipe to the South Mayo River. At the time of the site visit, the discharge appeared clear with no foam.

Sludge that is collected in the clarifiers is pumped to two aerated aerobic digesters. Periodically, sludge from the digesters is pumped and polymer (189K Flocculant) is added to thicken it. Then, the sludge is dewatered with a belt press. Dewatered sludge flows through a hopper to be transported to an onsite storage building. There was some sludge material at the entrance to the storage building and this material needs to be kept under cover to avoid exposure to storm water. The concrete floor is equipped with a drain line which collects any seepage from the sludge and conveys it back to the plant influent for treatment. Periodically, sludge is hauled to the Roxboro Landfill. Alternately, the sludge may be land applied.



Attachment E

Ambient Water Quality Information

- **STORET Data (Station 4ASMR033.98)**
- **Bacteria TMDL for South Mayo River (Excerpt)**
- **2010 Impaired Waters Summary Report (Excerpt)**
- **Roanoke River Basin Comprehensive Water Resources Plan (Excerpt)**
- **Endangered Species Information**

STORET Station 4ASMR033.98 SouthMayo River (State Road 787 bridge)
Watershed ID: VAW-L34R

Collection Date Time	Temp Celsius	pH (S.U.)
01/08/1997 13:30	4.6	8.3
04/02/1997 13:00	11.5	8
07/08/1997 13:00	18.2	7.7
10/20/1997 13:00	11.3	7.5
01/12/1998 12:00	7.7	7.5
04/07/1998 15:05	16	8.7
04/14/1998 13:00	11.7	7.9
07/20/1998 13:30	21.7	8
10/27/1998 13:30	12.4	7.4
01/12/1999 13:00	4.2	7.3
04/05/1999 13:30	13.6	7.8
07/14/1999 13:30	17.8	8.4
11/18/1999 13:00	7.5	7.8
01/13/2000 13:00	8.3	7.9
03/08/2000 13:00	14.2	7.3
05/04/2000 13:00	17.2	NULL
08/28/2001 14:00	21.5	8.3
10/17/2001 13:30	10.4	7.35
12/04/2001 13:30	7.9	7.7
02/21/2002 13:00	9.8	7.5
05/23/2002 13:00	14.9	8.7
06/19/2002 11:45	20	8.33
08/06/2002 13:15	24.9	8
10/29/2002 13:20	11.1	6.64
12/17/2002 12:45	6.4	7.66
02/13/2003 13:00	3.1	7.6
04/16/2003 12:30	15	7.5
06/25/2003 13:30	17.5	7.3
02/21/2007 15:00	10.1	7.4
04/12/2007 15:00	14.8	8
06/20/2007 14:30	20.8	6.6
08/02/2007 15:30	21.6	6.7
10/18/2007 14:30	17.3	6.4
12/18/2007 14:00	3.3	9.1
02/28/2008 15:30	5.6	7
04/09/2008 14:00	13.2	7.5
06/24/2008 15:00	20.6	7.2
08/28/2008 14:30	18.4	7.6
10/28/2008 15:30	8.5	7.4
12/22/2008 16:00	3.2	7.6

90th Percentile pH	8.3	S.U.	
10th Percentile pH	6.9	S.U.	
Temperature	20.9	°C	90th Percentile Jan. - Dec.
Temperature	19.8	°C	90th Percentile Jan. - June

STORET Station 4ASMR033.98 SouthMayo River (State Road 787 bridge)
Watershed ID: VAW-L34R

Collection Date Time	Hardness, Total (mg/L as CaCO ₃)
01/16/1990 11:00	14
04/09/1990 11:00	12
07/11/1990 11:00	10
10/22/1990 12:30	13
01/14/1991 12:00	18
10/22/1991 11:00	26
04/07/1992 14:00	18
07/15/1992 11:00	14
10/19/1992 11:30	20
01/25/1993 11:00	14
04/14/1993 11:00	12
07/15/1993 11:00	14
10/27/1993 10:30	22
01/24/1994 12:00	10
07/13/1994 11:00	11
10/18/1994 11:00	12
01/24/1995 11:00	8
04/10/1995 11:00	13
07/17/1995 12:00	15
10/05/1995 11:30	40
01/17/1996 10:30	11
04/03/1996 12:00	11
07/15/1996 11:30	20
11/26/1996 13:00	12
01/08/1997 13:30	11
04/02/1997 13:00	6.7
07/08/1997 13:00	11.5
10/20/1997 13:00	11.1
01/12/1998 12:00	13.1
04/14/1998 13:00	20
07/20/1998 13:30	23.5
10/27/1998 13:30	14
01/12/1999 13:00	10
04/05/1999 13:30	20
07/14/1999 13:30	15.7
11/18/1999 13:00	12
01/13/2000 13:00	18.1
03/08/2000 13:00	14
05/04/2000 13:00	8
08/28/2001 14:00	8.4
10/17/2001 13:30	10.2
12/04/2001 13:30	17.3
02/21/2002 13:00	13
05/23/2002 13:00	24.7
06/19/2002 11:45	17
08/06/2002 13:15	20.6
10/29/2002 13:20	26.6
12/17/2002 12:45	17.9
02/13/2003 13:00	16.7
04/16/2003 12:30	10.4
06/25/2003 13:30	10

mean	15	mg/L
use default 25 mg/L for wasteload allocation spreadsheet		

Bacteria TMDL for South Mayo River Patrick County, Virginia

Submitted by

Virginia Department of Environmental Quality

**January, 2004
(Revised February, 2004)**

Executive Summary

This report presents the development of a Bacteria Total Maximum Daily Load (TMDL) for the South Mayo River watershed. The South Mayo River watershed is located in Patrick County in the Roanoke River Basin (USGS Hydrologic Unit Code 03010103). The waterbody identification code (WBID, Virginia Hydrologic Unit) for South Mayo River is VAW-L43R in the West Central region of Virginia.

The impaired segment is 5.77 miles in length. The upper limit is the Russell Creek mouth on the South Mayo River and extends downstream to the confluence of Spoon creek on the South Mayo River. (Note: The 1998 listed segment was erroneously assigned to watershed VAW-L45R. Changes in segment mileage are due to the use of the National Hydrography Dataset.)

The drainage area of the South Mayo River watershed is approximately 86.8 square miles. The average annual rainfall as recorded at Stuart, VA (~10 miles northwest of study area) is 51.53 inches. The watershed study area is approximately 56,000 acres, which is predominately forested (74 percent), with the majority of the remaining area in pasture land (22 percent). The remaining four percent of the watershed consists of residential areas, crop land, wetlands, and open water. A map of the distribution of land use in the watershed indicates that the pasture land tends to be located closer to the stream, while the forest land is farther from the stream. This is most likely due to the hilly topography of the watershed. The steeper slopes at the edges of the watershed have remained forested while the shallower slopes near the stream are used for agriculture.

South Mayo River was listed as impaired on Virginia's 1998 303(d) Total Maximum Daily Load Priority List and Report and the 2002 303(d) Report on Impaired Waters (VADEQ, 1998 & 2002) due to violations of the State's water quality standard for fecal coliform bacteria. Out of 18 samples collected during the 1998 assessment period, 5 violated the water quality standard at station 4ASMR016.09. During the most recent 2002 assessment period, 3 of 22 samples violated the water quality standard at station 4ASMR016.09.

According to Virginia Water Quality Standards (9 VAC 25-260-10A), "all state waters are designated for the following uses: recreational uses (e.g., swimming and boating); the propagation and growth of a balanced indigenous population of aquatic life, including game fish, which might be reasonably expected to inhabit them; wildlife; and the production of edible and marketable natural resources (e.g., fish and shellfish)."

As indicated above, South Mayo River must support all designated uses and meet all applicable criteria. The South Mayo River does not currently support primary contact recreation.

The load-duration approach is used to develop the TMDL for the study watershed.

The assessment of bacterial sources involves estimating loads from various sources in the watershed. It was accomplished by determining the relative contribution by these sources using Biological Source Tracking (BST) methodology. A total of 12 ambient water quality samples were collected on a monthly basis from September 2002 through October 2003 for BST analysis. The results indicate that the majority of bacteria are coming from anthropogenic sources. Four categories of sources were considered: human, pet, livestock and wildlife. The analyses determined the relative contribution of all bacteria by these sources. The data indicated that on an average basis, relative contributions of bacteria are – 18.35% by human, 28.83% by pet, 34.42% by livestock, and 18.40% by wildlife. Fecal and *E.coli* bacteria were also enumerated as part of the BST analyses.

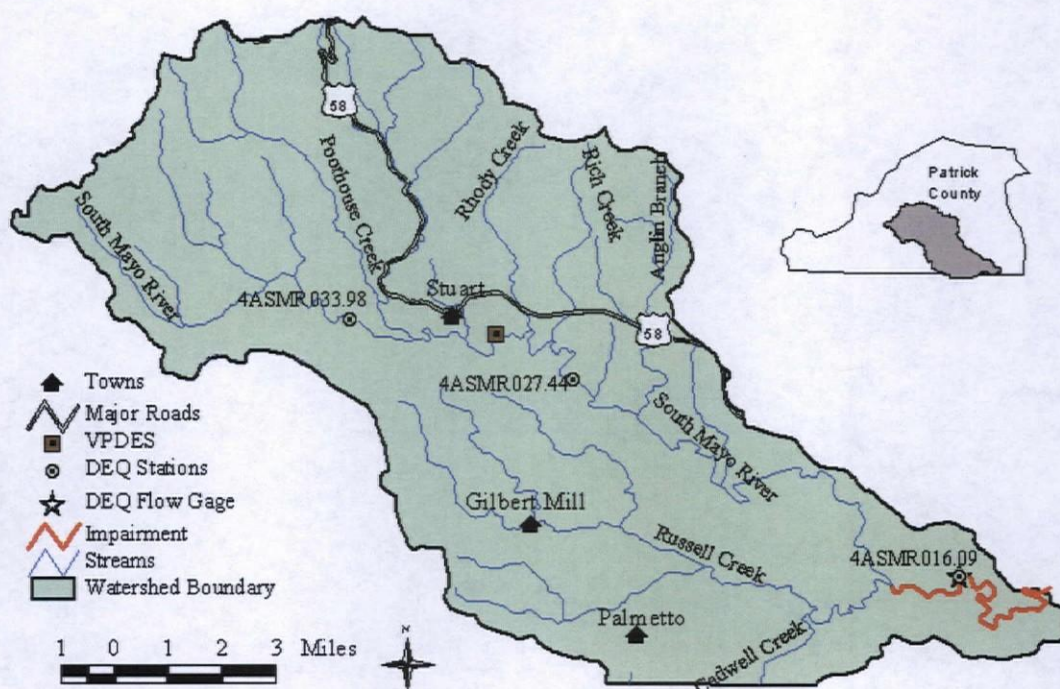
The bacteria loads in the study watershed were calculated for point source and non-point sources. The study area has one sewage treatment plant having an average discharge of ranging from 0.256 million gallons per day to 0.485 million gallons per day (MGD). The flows are within DEQ's permitted level of 0.60 MGD. The permitted loads were calculated by multiplying the permitted discharge concentration (126

2. Physical Setting

2.1. Listed Water Bodies

South Mayo River is located in Patrick County in the Roanoke River Basin (USGS Hydrologic Unit Code 03010103). The waterbody identification code (WBID, Virginia Hydrologic Unit) for South Mayo River is VAW-L43R. The impaired segment is 5.77 miles in length. The upper limit is the Russell Creek mouth on the South Mayo River and extends downstream to the confluence of Spoon creek on the South Mayo River. *Note: The 1998 listed segment was erroneously assigned to watershed VAW-L45R. Changes in segment mileage are due to the use of the National Hydrography Dataset (NHD).* The South Mayo River watershed is outlined.

Figure 1. Map of the South Mayo River study area



cfu/100 ml) times the permitted flow times the appropriate unit conversions. For non-point sources (human, pets, livestock, and wildlife) total annual fecal productions were calculated separately. Data on population density and waste production by septic systems, pets, livestock and wildlife were collected from various sources, and total fecal productions were calculated with appropriate unit conversions.

The load-duration method essentially uses an entire stream flow record to provide insight into the flow conditions under which exceedances of the water quality standard occur. The flow-duration curve using historical flow data collected at the USGS gaging station (#02069700) was developed. The station was also the site for bacteria water quality sampling collected monthly for the study watershed. The load-duration curve was then developed by multiplying each flow level along the flow-duration curve by the applicable water quality standard and required unit conversions. Each water quality observation is then assigned to a flow interval by comparing the date of each water quality observation to the flow record of the reference stream. The stream flow from the date of the water quality observation is then used to calculate a stream flow and flow-duration interval for the stream. The loads on the load-duration curve are multiplied by 365 days/year to determine the annual loads. Fecal coliform data was converted to *E. coli* using a translator equation developed based on the data sets from the DEQ's statewide monitoring network. The observed loads were plotted on the load-duration curve to determine the number and pattern of exceedances of water quality standards (TMDL).

The results indicated that the highest exceedance of the water quality standard occurred at a normal flow that has been exceeded approximately 65% of the time (~77 cfs). This represents the flow condition under which the largest bacteria reduction is required in order to meet water quality standards. The translated load at this flow condition is 8.94×10^{15} cfu/yr. To meet water quality standard of instantaneous *E. coli* of 235 cfu/100mL, this load would have to be reduced by 98% to an allowable load of 1.62×10^{14} cfu/yr. The allowable load is simply the *E. coli* standard multiplied by the applicable flow condition and the proper unit conversions.

For South Mayo River watershed, the average annual *E. coli* load is 1.46×10^{16} cfu/yr, and the TMDL under average annual flow conditions is 2.65×10^{14} cfu/yr. These values are used to calculate required reductions. By subtracting the waste load allocation (known value) from the TMDL (as computed), and the implicit margin of safety, the load allocation was determined. These values are presented in the following Table.

Table E1. Average annual *E. coli* loads and TMDL for South Mayo River watershed (cfu/yr)

WLA ¹	LA	MOS	TMDL
1.04×10^{12}	2.640×10^{14}	(implicit)	2.650×10^{14}

¹ The point source permitted to discharge in the South Mayo River watershed are presented in section 5.2.

For South Mayo River, the WLA represents less than 0.4% of the TMDL load. The required reduction of 98% is to be applied to each of the four non-point sources identified in the BST analysis.

The South Mayo River TMDL development presented in this report is the first step toward the attainment of water quality standards. The second step is to develop a TMDL implementation plan, and the final step is the field implementation of the TMDL to attain water quality standards.

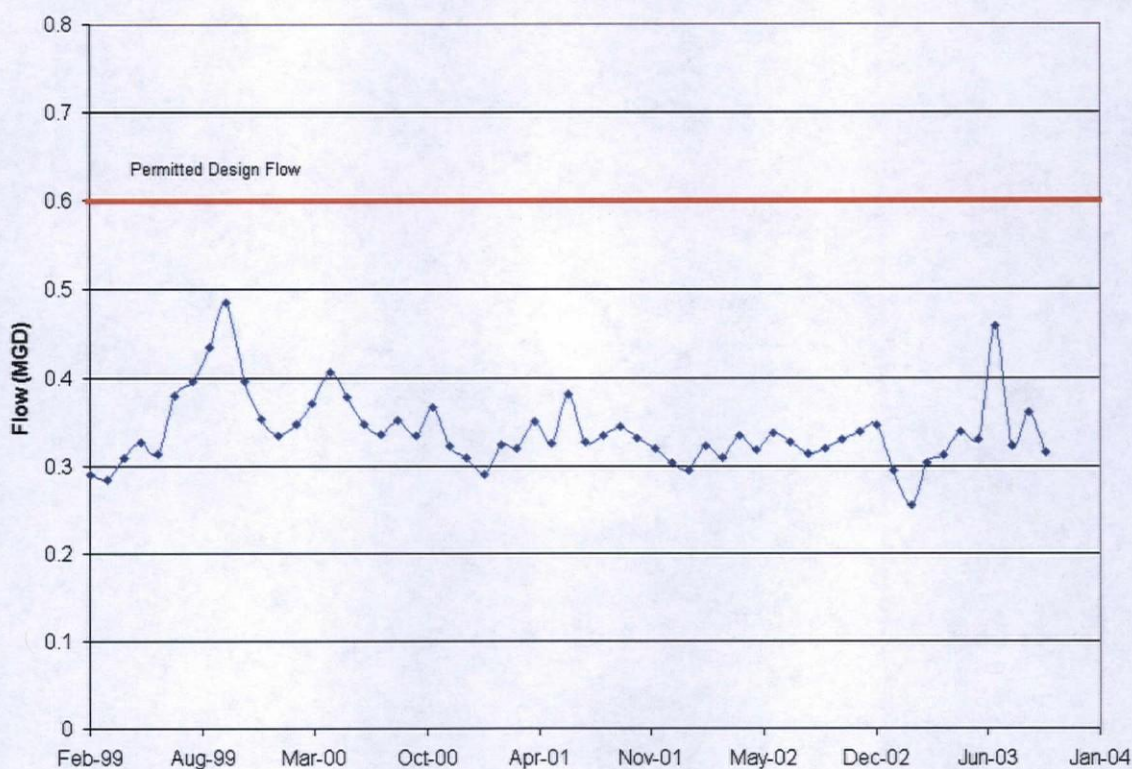
The Commonwealth intends for this TMDL to be implemented through a process of phased implementation of best management practices (BMPs). The development of South Mayo River TMDL requires a 98% reduction in non-point source loading in order to attain a 0% violation of water quality

Table 7. VPDES point source facilities and loads

VPDES Permit Number	Facility Name	Receiving Stream	Watershed ID	Design Flow (MGD)	Effluent Limit (cfu/100 ml)	Wasteload Allocation
VA0022985	Stuart STP	South Mayo River	VAW-L45R	0.6	126	1.04×10^{12}
Existing WLA					N/A	
Expansion Matrix						
					Total x 2	2.08×10^{12}
					Total x 5	5.20×10^{12}

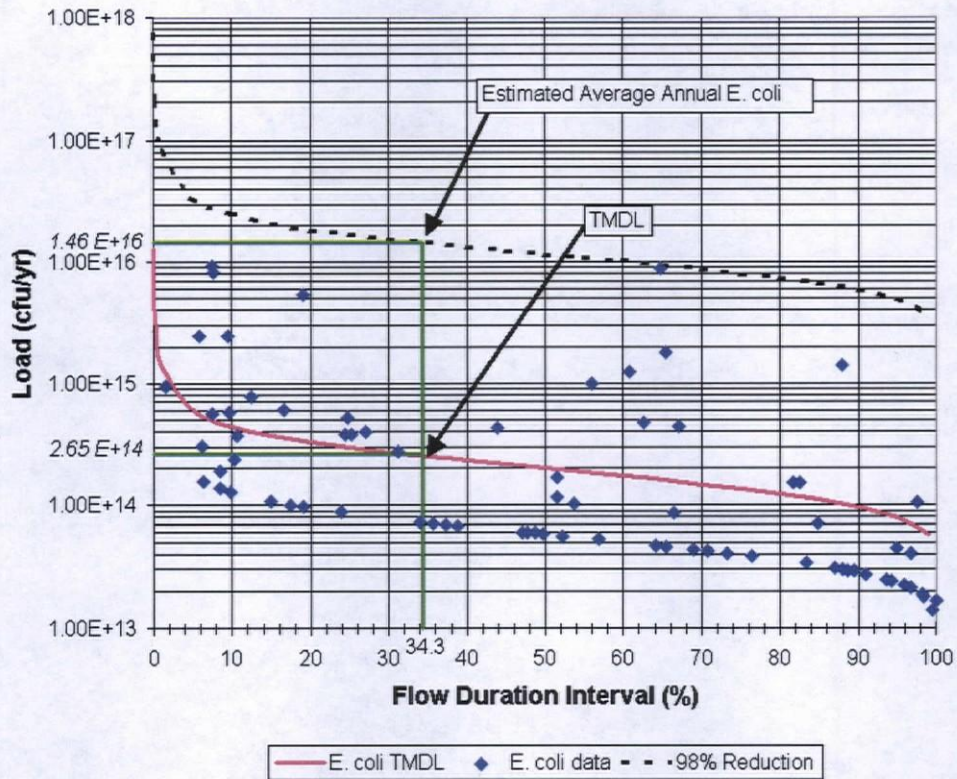
Permitted loads were calculated by multiplying the permitted discharge concentration (126 cfu/100 ml) times the design flow (0.6 MGD or 600,000 gal/day) times the appropriate unit conversions. The calculation is presented in Appendix C.

Figure 9. Stuart STP Average Daily Flow



The Stuart Sewage Treatment Plant (STP) is permitted to discharge an average of 600,000 gallons per day (gpd) or 0.6 million gallons per day (MGD). Figure 9 shows the variation of the Stuart STP flow from February 1999 until October 2003. The average daily flow ranged from 256,000 to 485,000 gpd (0.256 to 0.485 MGD). These flows are within DEQ permitted levels.

Figure 14. Load duration curve illustrating the TMDL and estimated average annual *E. Coli* load for South Mayo River at station 4ASMR016.09



The average annual *E. coli* load is 1.46×10^{16} cfu/yr, and the TMDL under average annual flow conditions is 2.65×10^{14} cfu/yr. These values are used to calculate required reductions. By subtracting the waste load allocation (known value) from the TMDL (as determined above), the load allocation can be determined. These three values are presented in Table 11.

Table 11. Average annual *E. coli* loads and TMDL for South Mayo River watershed (cfu/yr)

WLA ¹	LA	MOS	TMDL
1.04×10^{12}	2.640×10^{14}	(implicit)	2.650×10^{14}

¹ The point source permitted to discharge in the South Mayo River watershed are presented in section 5.2.



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet prepared for DCR Watershed: L43*

Cause Group Code: L43R-01-BAC

South Mayo River

Location: The upper limit is 0.3 miles upstream of the Wilson Creek mouth (near Dobyns) on the South Mayo River and extends downstream to the Virginia / North Carolina State Line.

City / County: Henry Co.

Patrick Co.

Use(s): Recreation

Cause(s) /

VA Category: Escherichia coli/ 4A

The South Mayo River Bacteria TMDL Load Duration Study is U.S. EPA approved on 02/27/2004 and SWCB approval on 6/17/2004 for the original 1998 303(d) Listed 5.78 mile impairment. Extensions described below were not specifically addressed by the Load Duration TMDL. The Dan River Bacteria Total Maximum Daily Load (TMDL) is U.S. EPA approved on 12/08/2008 [Fed ID 35757] and SWCB approved 4/28/2009. The Dan River Bacteria TMDL incorporates the extensions described below and are nested within the Bacteria TMDL. The TMDL can be viewed at <http://www.deq.virginia.gov>. Additional data collection causes the original 1998 bacteria impairment (from Russell Creek mouth downstream to the mouth of Spoon Creek) to be extended 19.98 miles upstream with the 2004 Integrated Report (IR). The 2004 IR also extends the original listed bacteria impairment 10.85 miles downstream for a total impaired mileage of 36.61.

The original bacteria impairment (5.78 miles) is based on fecal coliform (FC) bacteria data producing a greater than 10 percent exceedance rate of the former 1998 1000 cfu/100 ml instantaneous criterion at station 4ASMR016.09 (Rt. 700 Bridge at the USGS gaging station). Additional data collection and application of the former FC 400 cfu/100 ml instantaneous criterion results in the 2004 IR extension upstream from two stations 4ASMR033.98 (Rt. 787 Bridge West of Stuart) and 4ASMR027.44 (Rt. 681 Bridge South of Stuart). The 2004 10.85 mile downstream extension in watershed L45 results from additional FC data collection at station 4ASMR004.14 (Rt. 695 Bridge).

Station 4ASMR033.98 (Rt. 787 Bridge West of Stuart) 2010 escherichia coli (E.coli) samples exceed the 235 cfu/100 ml instantaneous criterion in two of 12 samples. Exceeding values are 420 and 450 cfu/100 ml. FC exceeds the former 400 cfu/100 ml instantaneous criterion in two of 12 samples within the 2008 data window. 2008 exceeding values are 900 and 1200 cfu/100 ml. The 2006 IR data window produces FC exceedances in two of 15 samples with the same exceedance range as 2008. The 2004 IR initial 303(d) Listing Cycle found five of 20 fecal coliform samples exceed the former 400 cfu/100 ml instantaneous criterion. Exceeding values range from 500 to 1200 cfu/100 ml. (Note: 4ASMR033.98 is a 1999 Federal Consent Decree Attachment B station for fecal coliform bacteria. The station was not 2002 303(d) Listed as there are no exceedances of the former 1000 cfu/100 ml criterion from 19 samples within the 2002 data window.)

4ASMR027.44- (Rt. 681 Bridge South of Stuart) Two of 12 escherichia coli (E.coli) samples exceed the 235 cfu/100 ml instantaneous criterion at 320 and greater than 2000 cfu/100 ml within the 2010 data window. Both the 2008 and 2006 IRs find two of 12 FC samples exceed the former 400 cfu/100 ml instantaneous criterion at 1400 and 1700 cfu/100 ml. The 2004 IR initial 303(d) Listing Cycle found two excursions from nine observations and the same range of exceedance.

4ASMR016.09- (Rt. 700 Bridge at the USGS gaging station) 2010 assessment finds E.coli exceed the 235 cfu/100 ml instantaneous criterion in 15 of 41 samples. The range of exceedance is from 250 to greater than 2000 cfu/100 ml. The 2008 IR reports E.coli exceeds the instantaneous criterion in 11 of 33 samples. The range of exceedance is from 250 to greater than 2000 cfu/100 ml. Eight of 20 E.coli samples exceed the instantaneous criterion within the 2006 data window with the same range of exceedance as 2008. One of three E.coli observations exceed the instantaneous criterion in 2004.

4ASMR004.14- (Rt. 695 Bridge) E.coli exceedances occur in four of 17 samples ranging from 350 to 700 cfu/100 ml within both the 2008 and 2010 data windows. Each excursion is in excess of the 235 cfu/100 ml instantaneous criterion.

2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet prepared for DCR Watershed: L43*

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-L43R_SMR01A00 / South Mayo River / South Mayo River mainstem from the Russell Creek mouth downstream to the Spoon Creek confluence.	4A Escherichia coli		2006	2/27/2004	5.78
VAW-L43R_SMR02A02 / South Mayo River / South Mayo River mainstem from the Anglin Branch confluence downstream to the Russell Creek confluence on the South Mayo River.	4A Escherichia coli	Y	2010	12/8/2008	8.01
VAW-L43R_SMR03A02 / South Mayo River / South Mayo River mainstem from the Town of Stuart POTW downstream to the confluence of Anglin Branch.	4A Escherichia coli	Y	2010	12/8/2008	4.39
VAW-L43R_SMR03B02 / South Mayo River / South Fork Mayo River mainstem from the confluence of the North Fork South Mayo River downstream to the Town of Stuart POTW.	4A Escherichia coli	Y	2010	12/8/2008	2.25
VAW-L43R_SMR04A00 / South Mayo River / South Mayo River mainstem from the Town of Stuart water intake downstream to the North Fork South Mayo River confluence.	4A Escherichia coli	Y	2010	12/8/2008	0.39
VAW-L43R_SMR05A00 / South Mayo River / South Mayo River mainstem from the WQS natural trout section just upstream of the Stuart water intake downstream to the Town of Stuart intake.	4A Escherichia coli	Y	2010	12/8/2008	0.48
VAW-L43R_SMR06A00 / South Mayo River / South Mayo River mainstem from upstream of the Wilson Creek mouth downstream to the end of the WQS natural trout section located just upstream of the Town of Stuart water intake.	4A Escherichia coli	Y	2010	12/8/2008	4.46
South Mayo River			Estuary (Sq. Miles)	Reservoir (Acres)	River (Miles)
DCR Watershed: L43*					
Escherichia coli - Total Impaired Size by Water Type:					25.76

Sources:

Livestock (Grazing or Feeding Operations)

Municipal (Urbanized High Density Area)

On-site Treatment Systems (Septic Systems and Similar Decentralized Systems)

Unspecified Domestic Waste

Wastes from Pets

Wet Weather Discharges (Non-Point Source)

Wildlife Other than Waterfowl

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.



2010 Impaired Waters

Categories 4 and 5 by DCR Watershed*

Roanoke and Yadkin River Basins

Fact Sheet prepared for DCR Watershed: **L43***

Cause Group Code: **L43R-01-TEMP** **South Mayo River**

Location: South Mayo River mainstem from upstream of the Wilson Creek mouth downstream to the end of the WQS natural trout section located just upstream of the Town of Stuart water intake.

City / County: Patrick Co.

Use(s): Aquatic Life

Cause(s) /

VA Category: Temperature, water/ 5C

These waters were previously 303(d) Listed in 2004 and de-listed in 2006. The temperature impairment returns with the 2010 assessment.

4ASMR033.98 (Rt. 787 Bridge west of Stuart)- 2010 data find the Aquatic Life Use is impaired where temperature measurements exceed the Class VI 20°C criterion in three of 15 samples. Excursions range from 20.6 to 20.8°C.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-L43R_SMR06A00 / South Mayo River / South Mayo River mainstem from upstream of the Wilson Creek mouth downstream to the end of the WQS natural trout section located just upstream of the Town of Stuart water intake.	5C Temperature, water		2010	2022	4.46

South Mayo River

DCR Watershed: L43*

Estuary
(Sq. Miles)

Reservoir
(Acres)

River
(Miles)

Temperature, water - Total Impaired Size by Water Type:

4.46

Sources:

Source Unknown

*Header Information: Location, City/County, Cause/VA Category and Narratives; describe the entire extent of the Impairment. Sizes presented are for Assessment Units (AUs) lying within the DCR Watershed boundary noted above.

NOTE: THIS PLAN VERSION HAS NOT
BEEN APPROVED.

TABLE 2: SEGMENT CLASSIFICATION - STANDARDS
SMITH-DAN RIVER SUBAREA
HUC CODES 03010103, 03010104, 03010105 AND 03040101

<u>Stream Name</u>	<u>Former 303(e) Segment Number</u>	<u>Mile to Mile</u>	<u>Stream Classification</u>	<u>Comments</u>	<u>WBIDs</u>
					HUC 03010103
Dan River	4A-10	211.25 to 168.57	E.L.	Main and tributaries.	-19R, -20L, -21L
Little Dan River	4A-10	12.06 to 0.88	E.L.	Main and tributaries to VA-NC State Line.	-19R
South Mayo River	4A-8	40.93 to 32.85	W.Q.-FC	Main only to confluence with N.F. South Mayo River.	-15R
South Mayo River	4A-8	40.93 to 32.85	E.L.	Tributaries to confluence with N.F. South Mayo River.	-15R, -17L, -18L
South Mayo River	4A-8	32.85 to 25.85	W.Q.-DO, FC	Main only.	-16R
South Mayo River	4A-8	32.85 to 25.85	E.L.	Tributaries only.	-15R
South Mayo River	4A-8	25.85 to 0.32	E.L.	Main and tributaries from confluence with N.F. South Mayo River to VA-NC State Line.	-15R
North Mayo River	4A-8	23.42 to 0.19	E.L.	Main and tributaries to VA-NC State Line.	-14R
Smith River	4A-7	85.42 to 46.82	E.L.	Main and tributaries to Philpott Dam.	-10L, -11R, -12L, -13R
Smith River	4A-7	46.82 to 26.66	W.Q.-DO, FC	Main only from Philpott Dam to Martinsville City Dam.	-07R
X-Trib. to Smith River	4A-7	0.32 to 0.00	W.Q.-DO	Main only.	-08R
Rangely Creek	4A-7	4.60 to 0.00	W.Q.-FC	Main only.	-06R
Reed Creek	4A-7	13.10 to 0.00	E.L.	Main and tributaries.	-08R
Smith River	4A-7	46.82 to 26.66	E.L.	Tributaries only from Philpott Dam to Martinsville City Dam.	-06R, -08R, -09L
Smith River	4A-7	26.66 to 5.88	W.Q.-DO	Main only from Martinsville City Dam to VA-NC State Line.	-04R
Marrowbone Creek	4A-7	13.93 to 0.00	E.L.	Main and tributaries.	-06R
Smith River	4A-7	26.66 to 5.88	E.L.	Tributaries only from Martinsville City Dam to VA-NC State Line.	-05R, -06R
X-Trib. to Reds Creek	4A-7	1.04 to 0.00	W.Q.-DO	Main only.	-06R
Leatherwood Creek	4A-7	19.14 to 0.00	E.L.	Main and tributaries.	-05R

NOTE: THIS PLAN VERSION HAS NOT BEEN APPROVED.

STATE WATER CONTROL BOARD
VR - - SMITH-DAN RIVER SUBAREA
WATER QUALITY MANAGEMENT PLAN

PAGE 58 OF 103

TABLE 6: WASTELOAD ALLOCATIONS BASED ON EXISTING DISCHARGE POINT¹
SMITH-DAN RIVER SUBAREA

Hap Loca- tion	Stream Name	Former 303(e) Segment Number	WDID	Segment ² Classification Standards	Mile to ³ Mile	Discharger	VPDES Permit Number	VPDES Permit Limits BOD ₅ kg/day	303(e) ⁴ Wasteload Allocation BOD ₅ kg/day	Total Maximum Daily Load W.Q. Segments BOD ₅ kg/day
HUC 03040101										
A	Birds Br.	4B-1	-01R	E.L.	3.24-	Doe Run Lodge Properties, Inc. - Doe Run Lodge STP	VA0066532	1.40	Secondary	
B	X-Trib. to Birds Br.	4B-1	-01R	E.L.	1.44-	Groundhog Mtn. Property Owners, Inc., - Groundhog Mtn. STP	VA0066575	3.00	Secondary	
HUC 03010103										
1	X-Trib. to South Hays R.	4A-8	-15R	E.L.	0.42-	Stuart Town WTP	VA0055336	N/A	Secondary	
	South Hays R.	4A-8	-16R	W.Q.-DO, FC	32.05-25.05	SOUTH HAYS R. SEGMENT			64.00	138.20
2					31.98	United Elastic Corp. Stuart Plant	VA0001546	N/A	N/A	
C					*30.78	Stuart Town STP	VA0022985	64.00	64.40	
3	Rhody Cr.	4A-8	-15R	E.L.	0.20-	JPS Elastomerics Corp. Patrick Plant	VA0001562	0.53	Secondary	
D	X-Trib. to Jennings Cr.	4A-8	-14R	E.L.	0.20-	VDOC - Field Unit #28 STP	VA0023558	2.50	Secondary	
4	Smith R.	4A-7	-11R	E.L.	76.62-	Liberty Fabrics, Inc.	VA0001554	34.00	Secondary	
5	Hale Cr.	4A-7	-11R	E.L.	0.68-	VDPR - Fairystone State Park WTP	VA0030660	N/A	Secondary	
HS	Town Cr.	4A-7	-08R	E.L.	5.16-	Blue Ridge Talc Co., Inc.	VA0087157	N/A	Secondary	
6	X-Trib. to Smith R.	4A-7	-06R	E.L.	0.22-	Henry Co. PSA - Upper Smith River WTP	VA0058441	N/A	N/A	N/A
CG	Towne Cr.	4A-7	-08R	E.L.		Bassett Mirror Company, Inc.	VA0086665	0.40	Secondary	
7	Smith R.	4A-7	-07R	W.Q.-DO, FC	39.94-	Bassett Furniture Industries	VA0022080	N/A	N/A	N/A
HS	X-Trib. to Smith R.	4A-7	-08R	W.Q.-DO	0.32-0.00	Clyde D. Prillman - Stone Hollow Lagoon	VA0086806	0.55	0.55	0.63

PROJECT Roanoke River Basin Water

Quality Management Plan

Study Area STUART - PATRICK SPRINGS

CONTENTS Assimilation Capacity Analysis

ALT. 1 & 3

Hayes, Seay, Horn and Mattern

ARCHITECTS • ENGINEERS • PLANNERS

DATE _____ COMM NO. 3828-T

PREL. _____ FINAL _____ SHEET NO. _____

CAL. BY _____ CKD. BY _____

STUART
YEAR 2000
SOUTH MAYO RIVER

Selected Alternative

$$Q_w = 0.424 \text{ MGD} = 0.656 \text{ CFS}$$

$$D_{Ow} = 3.0 \text{ mg/l}$$

$$Q_s = 8.02 \text{ CFS}^*$$

$$D_{Os} = 7.3 \text{ mg/l (100\% SAT., 1200', 30°C)}$$

$$\frac{(0.656)(3.0) + (8.02)(7.3)}{(0.656) + (8.02)} = D_{Omix} = 6.97 \text{ mg/l}$$

$$D_{Omix} = 6.97 \text{ mg/l}$$

$$Q_{mix} = 8.67 \text{ CFS}$$

$$S = 0.0060 \text{ FT/FT}$$

$$T = 30^\circ \text{C}$$

$$D_{O_{sag}} = 6.4 \text{ mg/l}^+$$

206.70 #/day BOD₅ Assimilation Capacity

$$\begin{array}{r} 206.70 \text{ \#/day BOD}_5 \text{ Assimilation Capacity} \\ - 64.81 \text{ \#/day BOD}_5 \text{ Background (At 1.5 mg/l)} \\ \hline 141.89 \text{ \#/day BOD}_5 \text{ Allowable Discharge} \end{array}$$

At 0.23 #BOD₅/100 Gal., the raw loading is 975.2 # BOD₅/day

975.2 #/day BOD₅ Influent → 141.9 #/day BOD₅ Effluent

Requires 85.5% Treatment.

* $\frac{7}{10}$ Low Flow of 8.70 CFS MINUS PROTECTED WITHDRAWAL OF 0.68 CFS.

+ MINIMUM D.O. OF RECORD FOR 1970-1973 MINUS 0.2 mg/l.

Douglas W. Domenech
Secretary of Natural Resources



David A. Johnson
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Division of Natural Heritage
217 Governor Street
Richmond, Virginia 23219-2010
(804) 786-7951

September 13, 2012

Becky France
DEQ-BRRO
3019 Peters Creek Road
Roanoke, VA 24019

Re: VA0022985, Town of Stuart WWTP

Dear Ms. France:

The Department of Conservation and Recreation's Division of Natural Heritage (DCR) has searched its Biotics Data System for occurrences of natural heritage resources from the area outlined on the submitted map. Natural heritage resources are defined as the habitat of rare, threatened, or endangered plant and animal species, unique or exemplary natural communities, and significant geologic formations.

According to the information currently in our files, the Poorhouse Creek – Mayo River Stream Conservation Unit (SCU) is within the project site. SCUs identify stream reaches that contain aquatic natural heritage resources, including 2 miles upstream and 1 mile downstream of documented occurrences, and all tributaries within this reach. SCUs are given a biodiversity significance ranking based on the rarity, quality, and number of element occurrences they contain; on a scale of 1-5, 1 being most significant. The Poorhouse Creek – Mayo River SCU has been given a biodiversity significance ranking of B3, which represents a site of high significance. The natural heritage resources of concern associated with this SCU is:

Noturus gilberti

Orangefin madtom

G2/S2/SOC/LT

The Orangefin madtom is native to the Roanoke and James River systems of North Carolina and Virginia (NatureServe, 2009). The Orangefin madtom inhabits moderate to strong riffles and runs having little or no silt in moderate-gradient, intermontane and upper Piedmont streams. This species is an intersticine dweller, found in or near cavities formed by rubble and boulders (Jenkins and Burkhead, 1993). Please note that this species is currently classified as a species of concern (not a legal designation) by the United States Fish and Wildlife Service (USFWS) and as threatened by the Virginia Department of Game and Inland Fisheries (VDGIF).

Threats to the Orangefin madtom include channelization, siltation, and various forms of chronic pollution, catastrophic chemical spills, impoundment, dewatering, and bait-seining (NatureServe, 2009). Its low reproductive rate and short life span (Simonson 1997, Simonson and Neves 1992, Simonson 1987) exacerbate these threats (Burkhead and Jenkins 1991).

In addition, the South Fork Mayo River, which has been designated by the VDGIF as a "Threatened and Endangered Species Water", is within the project site. The species associated with this T & E Water is the James spiny mussel (*Pleurobema collina*, G1/S1/LE/LE). Poorhouse Creek has also been designated by the VDGIF as a T & E Water, and is downstream from the project site. The species associated with this T & E Water is the Orange-fin madtom.

To minimize impacts to aquatic resources, DCR recommends the use of uv/ozone to replace chlorination disinfection and utilization of new technologies as they become available to improve water quality. Due to the legal status of the James spiny mussel and the Orange-fin madtom, DCR also recommends coordination with the USFWS and the VDGIF to ensure compliance with protected species legislation.

There are no State Natural Area Preserves under DCR's jurisdiction in the project vicinity.

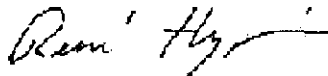
Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the DCR, DCR represents VDACS in comments regarding potential impacts on state-listed threatened and endangered plant and insect species. The current activity will not affect any documented state-listed plants or insects.

New and updated information is continually added to Biotics. Please contact DCR for an update on this natural heritage information if a significant amount of time passes before it is utilized.

The VDGIF maintains a database of wildlife locations, including threatened and endangered species, trout streams, and anadromous fish waters that may contain information not documented in this letter. Their database may be accessed from <http://vafwis.org/fwis/> or contact Gladys Cason (804-367-0909 or Gladys.Cason@dgif.virginia.gov). According to the information currently in our files, North Fork Poorhouse Creek, has been designated by the VDGIF as a T & E Water and is within 2 miles of the project area. The species associated with this T & E Water are the Orange-fin madtom. Therefore, DCR recommends coordination with VDGIF, Virginia's regulatory authority for the management and protection of this or these species to ensure compliance with the Virginia Endangered Species Act (VA ST §§ 29.1-563 – 570).

Should you have any questions or concerns, feel free to contact me at 804-371-2708. Thank you for the opportunity to comment on this project.

Sincerely,



S. Rene' Hypes
Project Review Coordinator

CC: Kim Smith, USFWS
Ernie Aschenbach, VDGIF

Literature Cited

Jenkins, R. E., and N. M. Burkhead. 1993. Freshwater fishes of Virginia. American Fisheries Society, Bethesda, Maryland.

NatureServe. 2009. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: June 21, 2010).

Simonson, T. D. 1987. Distribution, ecology, and reproductive biology of the orangefin madtom (*Noturus gilberti*). M.S. Thesis, Virginia Polytechnic Institute & State University, Blacksburg.

Simonson, T. D. 1997. Orangefin madtom. Pages 15-16 in E. F. Menhinick and A. L. Braswell, editors. Endangered, threatened, and rare fauna of North Carolina. Part IV. A reevaluation of the freshwater fishes. Occasional Papers of the North Carolina Museum of Natural Sciences and the North Carolina Biological Survey No. 11.

Simonson, T. D., and R. J. Neves. 1992. Habitat suitability and reproductive traits of the orangefin madtom *NOTURUS GILBERTI* (Pisces: Ictaluridae). American Midland Naturalist 127:115-24.

France, Becky (DEQ)

From: France, Becky (DEQ)
Sent: Wednesday, March 06, 2013 5:00 PM
To: Aschenbach, Ernie (DGIF)
Subject: RE: ESSLog 24644; DEQ VPDES re-issuance VA-0022985 for the Town of Stuart WWTP in Stuart, Virginia

I am in the process of drafting the permit for the reissuance of the Town of Stuart WWTP. I have reviewed your comments and recommendations to apply more stringent proposed EPA criteria for ammonia. DEQ acknowledges the research to support lower ammonia water quality criteria to protect mussels. The comments EPA received for the draft ammonia criteria are still under consideration. These criteria may not be final in Virginia for a few years and the exact numerical value of the proposed criteria may change during this process. We will forward your comments to the permittee to make them aware of potential water quality standards changes in the future that may affect their discharge.

As suggested an endangered species review has also been conducted by VDCR-DNH. A copy of the draft permit and Fact Sheet will be sent to US Fish and Wildlife for further endangered species review.

From: Aschenbach, Ernie (DGIF)
Sent: Wednesday, September 26, 2012 11:56 AM
To: France, Becky (DEQ)
Cc: ProjectReview (DGIF); Cason, Gladys (DGIF); nhreview (DCR); Susan.Lingenfelter@fws.gov
Subject: ESSLog 24644; DEQ VPDES re-issuance VA-0022985 for the Town of Stuart WWTP in Stuart, Virginia

We have reviewed the above-referenced VPDES permit re-issuance. According to the application, the treatment facility uses extended-aeration activated sludge plant treatment with dechlorination prior to its discharge with a capacity of 0.60 Million Gallons per Day (MGD). The 7Q10 of the receiving reach of the South Mayo River is 6.0 MGD.

According to our records, the South Mayo River is predicted habitat for the following listed Threatened and Endangered (T&E) species:

FSST	II	<u>Madtom, orangefin</u>	Noturus gilberti
FESE	I	<u>Logperch, Roanoke</u>	Percina rex
	II	<u>Madtom, spotted-margin</u>	Noturus insignis ssp 1
FESE	I	<u>Spiny mussel, James</u>	Pleurobema collina
ST	II	<u>Floater, green</u>	Lasmigona subviridis

In general, we recommend ultraviolet (UV) disinfection rather than chlorination disinfection. We support dechlorination, prior to discharge. The ammonia limits proposed within the EPA rule are expressed on the basis of total ammonia-nitrogen (TAN). The proposed EPA ammonia limit for waters with mussels (not T&E mussels, any mussel species) is:

- CMC (Criterion Maximum Concentration or acute) - 2.9 mg N/L (at pH 8 and 25C)
- CCC (Criterion Continuous Concentration or chronic) - 0.26 mg N/L (at pH 8 and 25C) with a 4-day average within the 30 day average period no higher than 2.5 the CCC, which would be 0.65 mg N/L.

The ammonia limits proposed within the EPA rule are the best information currently available regarding ammonia levels protective of mussels. Therefore, we recommend the EPA values be implemented in this permit for this and all future VPDES permits.

This project is located within 2 miles of a documented occurrence of a state or federal threatened or endangered plant or insect species and/or other Natural Heritage coordination species. Therefore, we recommend coordination with VDCR-DNH regarding the protection of these resources. We also recommend contacting the USFWS regarding all federally listed species.

Provided the applicant adheres to the effluent characteristics identified in the permit application, we do not anticipate the issuance of this permit to result in adverse impact to T&E species waters or their associated species. Thank you for the opportunity to provide comments.

Ernie Aschenbach
Environmental Services Biologist
Virginia Dept. of Game and Inland Fisheries
P.O. Box 11104
4010 West Broad Street
Richmond, VA 23230
Phone: (804) 367-2733
FAX: (804) 367-2427
Email: Ernie.Aschenbach@dgif.virginia.gov

Attachment F

Effluent Data

Town of Stuart WWTP
VPDES Permit No. VA0022985

Effluent pH (S.U.)

Date Due	min	max
10-Nov-08	6	6.9
10-Dec-08	6.01	6.65
10-Jan-09	6.01	6.75
10-Feb-09	6	6.46
19-Feb-09	6.1	6.1
10-Mar-09	6.01	6.63
10-Apr-09	6	6.68
10-May-09	6	6.69
10-Jun-09	6	6.64
10-Jul-09	6.01	6.57
10-Aug-09	6.02	6.73
10-Sep-09	6.11	6.65
10-Oct-09	6.02	6.99
10-Nov-09	6.07	6.81
10-Dec-09	6	6.63
10-Jan-10	6.02	6.58
10-Feb-10	6	6.59
19-Feb-10	6.1	6.1
10-Mar-10	6	6.59
10-Apr-10	6	6.68
10-May-10	6.12	6.85
10-Jun-10	6.43	6.98
10-Jul-10	6.27	7.02
10-Aug-10	6	6.81
10-Sep-10	6	6.91
10-Oct-10	6	6.84
10-Nov-10	6.01	6.73
10-Dec-10	6	8.52
10-Jan-11	6	6.69
10-Feb-11	6	7.2
19-Feb-11	6.1	6.1
10-Mar-11	6	6.87
10-Apr-11	6.01	6.7
10-May-11	6.03	6.7
10-Jun-11	6.08	6.79
10-Jul-11	6.24	7.19
10-Aug-11	6.11	6.9
10-Sep-11	6	6.87
10-Oct-11	6.01	6.97
10-Nov-11	6.1	6.92
10-Dec-11	6.01	7.28
10-Jan-12	6.01	6.86
10-Feb-12	6	6.68
10-Mar-12	6	6.72
10-Apr-12	6.02	6.8
10-May-12	6.02	6.54
10-Jun-12	6.02	6.79
10-Jul-12	6.01	6.74
10-Aug-12	6.05	6.78
10-Sep-12	6.19	6.68
10-Oct-12	6.08	6.73
10-Nov-12	6.07	6.79
10-Dec-12	6.02	6.67
10-Jan-13	6.01	6.4

90th Percentile pH 7.0 S.U.
10th Percentile pH 6.0 S.U.

Effluent Temperature (Outfall 001)

Date Due	°C
10-Nov-08	23.2
10-Dec-08	22.8
10-Jan-09	16.4
10-Feb-09	14.8
10-Mar-09	14.8
10-Apr-09	16.4
10-May-09	20.8
10-Jun-09	22.6
10-Jul-09	29.6
10-Aug-09	24.9
10-Sep-09	25.7
10-Oct-09	24.7
10-Nov-09	22.4
10-Dec-09	19.6
10-Jan-10	16.6
10-Feb-10	13.6
10-Mar-10	13.1
10-Apr-10	15.8
10-May-10	19.2
10-Jun-10	22.4
10-Jul-10	26.3
10-Aug-10	27.6
10-Sep-10	27.7
10-Oct-10	25.7
10-Nov-10	23.4
10-Dec-10	20
10-Jan-11	16.6
10-Feb-11	13.4
10-Mar-11	16.6
10-Apr-11	18.1
10-May-11	20.5
10-Jun-11	23.6
10-Jul-11	25.5
10-Aug-11	28.1
10-Sep-11	28.3
10-Oct-11	26.4
10-Nov-11	23.1
10-Dec-11	22.3
10-Jan-12	19
10-Feb-12	17.2
10-Mar-12	19.6
10-Apr-12	20.9
10-May-12	21.3
10-Jun-12	25.4
10-Jul-12	26.1
10-Aug-12	28.1
10-Sep-12	27
10-Oct-12	27
10-Nov-12	24.7
10-Dec-12	23.4
10-Jan-13	23.5
10-Nov-12	24.7
10-Dec-12	23.4
10-Jan-13	23.5

90th Percentile temperature 27.4
90th Percentile temperature 25.9 Jan. - June

Town of Stuart WWTP
VA0022985

Effluent Hardness

Date	Composite (mg/L)
11/29/12	71.7
9/15/12	100
9/13/12	130
9/12/12	152
9/23/11	96
9/21/11	66
9/20/11	74
10/11/10	98
9/29/10	82
9/28/10	80
12/5/08	88
12/3/08	88
12/2/08	76
9/19/08	100
9/18/08	92
9/16/08	108
Mean	94

Town of Stuart WWTP
VA0022985

Effluent Dissolved Copper

Date	Grab (µg/L)
05/30/07	7.0
02/04/08	8.0
04/10/08	9.6
04/11/08	10.8
04/14/08	9.3
04/15/08	10.3
10/29/12	7.6

Town of Stuart WWTP
VA0022985

Effluent Dissolved Zinc

Date	Grab (µg/L)
05/30/07	129
02/04/08	156
04/10/08	143
04/11/08	117
04/14/08	120
04/15/08	125
10/29/12	84.6



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ANALYTICAL RESULTS

Project: STUART WWTP ATTACHMENT A
Pace Project No.: 92136754

Sample: OUTFALL 001GRAB Lab ID: 92136754001 Collected: 10/29/12 08:50 Received: 10/29/12 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
MBIO E.coli (Quantitation) Analytical Method: EPA E.coli by Membrane Fill. Preparation Method: EPA E.coli by Membrane Fill.									
E.coli	5.2 MPN/100mL		1.0	1.0	1	10/29/12 13:15	10/30/12 14:05		R2
608SF GCS Pesticides and PCBs Analytical Method: EPA 608									
Aldrin	ND ug/L		0.010	0.0063	1	10/31/12 03:30	10/31/12 17:59	309-00-2	
alpha-BHC	ND ug/L		0.010	0.0042	1	10/31/12 03:30	10/31/12 17:59	319-84-6	
beta-BHC	ND ug/L		0.010	0.0063	1	10/31/12 03:30	10/31/12 17:59	319-85-7	
gamma-BHC (Lindane)	ND ug/L		0.010	0.0042	1	10/31/12 03:30	10/31/12 17:59	58-89-9	
Chlordane (Technical)	ND ug/L		0.52	0.084	1	10/31/12 03:30	10/31/12 17:59	57-74-9	
4,4'-DDD	ND ug/L		0.010	0.0052	1	10/31/12 03:30	10/31/12 17:59	72-54-8	
4,4'-DDE	ND ug/L		0.010	0.0084	1	10/31/12 03:30	10/31/12 17:59	72-55-9	
4,4'-DDT	ND ug/L		0.010	0.0052	1	10/31/12 03:30	10/31/12 17:59	50-29-3	
Dieldrin	ND ug/L		0.010	0.0052	1	10/31/12 03:30	10/31/12 17:59	60-57-1	
Endosulfan I	ND ug/L		0.010	0.0052	1	10/31/12 03:30	10/31/12 17:59	959-98-8	
Endosulfan II	ND ug/L		0.010	0.0042	1	10/31/12 03:30	10/31/12 17:59	33213-65-9	
Endosulfan sulfate	ND ug/L		0.010	0.0042	1	10/31/12 03:30	10/31/12 17:59	1031-07-8	
Endrin	ND ug/L		0.010	0.0063	1	10/31/12 03:30	10/31/12 17:59	72-20-8	
Endrin aldehyde	ND ug/L		0.010	0.0084	1	10/31/12 03:30	10/31/12 17:59	7421-93-4	
Heptachlor	ND ug/L		0.010	0.0063	1	10/31/12 03:30	10/31/12 17:59	76-44-8	
Heptachlor epoxide	ND ug/L		0.010	0.0063	1	10/31/12 03:30	10/31/12 17:59	1024-57-3	
PCB-1016 (Aroclor 1016)	ND ug/L		0.52	0.084	1	10/31/12 03:30	10/31/12 17:08	12674-11-2	
PCB-1221 (Aroclor 1221)	ND ug/L		0.52	0.085	1	10/31/12 03:30	10/31/12 17:08	11104-28-2	
PCB-1232 (Aroclor 1232)	ND ug/L		0.52	0.12	1	10/31/12 03:30	10/31/12 17:08	11141-16-5	
PCB-1242 (Aroclor 1242)	ND ug/L		0.52	0.13	1	10/31/12 03:30	10/31/12 17:08	53469-21-9	
PCB-1248 (Aroclor 1248)	ND ug/L		0.52	0.29	1	10/31/12 03:30	10/31/12 17:08	12672-29-6	
PCB-1254 (Aroclor 1254)	ND ug/L		0.52	0.15	1	10/31/12 03:30	10/31/12 17:08	11097-69-1	
PCB-1260 (Aroclor 1260)	ND ug/L		0.52	0.11	1	10/31/12 03:30	10/31/12 17:08	11096-82-5	
Toxaphene	ND ug/L		0.52	0.39	1	10/31/12 03:30	10/31/12 17:59	8001-35-2	
Surrogates									
Tetrachloro-m-xylene (S)	94 %		53-110		1	10/31/12 03:30	10/31/12 17:59	877-09-8	
Decachlorobiphenyl (S)	68 %		61-121		1	10/31/12 03:30	10/31/12 17:59	2051-24-3	
8081 GCS Pesticides Analytical Method: EPA 8081									
Kepone	ND ug/L		10.4	0.19	1	10/31/12 03:30	11/12/12 20:35	143-50-0	
Methoxychlor	ND ug/L		0.010	0.0073	1	10/31/12 03:30	10/31/12 17:59	72-43-5	
Mirex	ND ug/L		0.010	0.0093	1	10/31/12 03:30	10/31/12 17:59	2385-85-5	
Surrogates									
Tetrachloro-m-xylene (S)	94 %		66.5-120.3		1	10/31/12 03:30	10/31/12 17:59	877-09-8	
Decachlorobiphenyl (S)	68 %		41.7-109.1		1	10/31/12 03:30	10/31/12 17:59	2051-24-3	
8141GCS O/P Extended Pesticide Analytical Method: EPA 8141									
Azinphos, methyl (Guthion)	ND ug/L		0.52	0.28	1	11/02/12 10:00	11/05/12 07:33	86-50-0	
Chlorpyrifos	ND ug/L		0.52	0.25	1	11/02/12 10:00	11/05/12 07:33	2921-88-2	
Demeton-O	ND ug/L		0.52	0.21	1	11/02/12 10:00	11/05/12 07:33	298-03-3	
Demeton-S	ND ug/L		0.52	0.23	1	11/02/12 10:00	11/05/12 07:33	126-75-0	L2

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ANALYTICAL RESULTS

Project: STUART WWTP ATTACHMENT A

Pace Project No.: 92136754

Sample: OUTFALL 001GRAB Lab ID: 92136754001 Collected: 10/29/12 08:50 Received: 10/29/12 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
8141GCS O/P Extended Pesticide Analytical Method: EPA 8141									
Malathion	ND ug/L		0.52	0.28	1	11/02/12 10:00	11/05/12 07:33	121-75-5	
Parathion (Ethyl parathion)	ND ug/L		1.0	0.49	1	11/02/12 10:00	11/05/12 07:33	56-38-2	
Surrogates									
4-Chloro3nitrobenzotrifluoride	64 %		34.2-122		1	11/02/12 10:00	11/05/12 07:33		
200.7 MET ICP Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Chromium	2.0J ug/L		5.0	0.40	1	10/31/12 11:50	11/07/12 22:15	7440-47-3	
200.7 MET ICP, Dissolved Analytical Method: EPA 200.7 Preparation Method: EPA 200.7									
Antimony, Dissolved	ND ug/L		5.0	2.6	1	10/31/12 19:30	11/02/12 05:13	7440-36-0	
Arsenic, Dissolved	ND ug/L		5.0	2.7	1	10/31/12 19:30	11/02/12 14:50	7440-38-2	
Beryllium, Dissolved	0.12J ug/L		1.0	0.10	1	10/31/12 19:30	11/02/12 05:13	7440-41-7	
Cadmium, Dissolved	ND ug/L		1.0	0.50	1	10/31/12 19:30	11/02/12 05:13	7440-43-9	
Chromium, Dissolved	2.2J ug/L		5.0	0.40	1	10/31/12 19:30	11/02/12 05:13	7440-47-3	
Copper, Dissolved	7.6 ug/L		5.0	0.30	1	10/31/12 19:30	11/02/12 05:13	7440-50-8	
Nickel, Dissolved	1.9J ug/L		5.0	1.7	1	10/31/12 19:30	11/02/12 14:50	7440-02-0	
Selenium, Dissolved	ND ug/L		10.0	3.8	1	10/31/12 19:30	11/02/12 05:13	7782-49-2	
Thallium, Dissolved	ND ug/L		10.0	3.0	1	10/31/12 19:30	11/02/12 14:50	7440-28-0	
Zinc, Dissolved	84.6 ug/L		10.0	0.40	1	10/31/12 19:30	11/02/12 05:13	7440-66-6	
200.8 MET ICPMS, Dissolved Analytical Method: EPA 200.8									
Silver, Dissolved	ND ug/L		0.10	0.050	1	11/02/12 09:40	11/02/12 15:39	7440-22-4	
Lead, Dissolved	ND ug/L		1.0	0.50	1	11/02/12 09:40	11/02/12 15:39	7439-92-1	
245.1 Mercury, Dissolved Analytical Method: EPA 245.1 Preparation Method: EPA 245.1									
Mercury, Dissolved	ND ug/L		0.20	0.090	1	11/01/12 17:20	11/02/12 14:16	7439-97-6	
625 MSSV Analytical Method: EPA 625 Preparation Method: EPA 625									
Acenaphthene	ND ug/L		5.0	0.25	1	10/31/12 14:30	11/02/12 01:12	83-32-9	
Acenaphthylene	ND ug/L		5.0	0.21	1	10/31/12 14:30	11/02/12 01:12	208-96-8	
Anthracene	ND ug/L		5.0	0.14	1	10/31/12 14:30	11/02/12 01:12	120-12-7	
Benzidine	ND ug/L		50.0	5.1	1	10/31/12 14:30	11/02/12 01:12	92-87-5	
Benzo(a)anthracene	ND ug/L		5.0	0.33	1	10/31/12 14:30	11/02/12 01:12	56-55-3	
Benzo(a)pyrene	ND ug/L		5.0	0.30	1	10/31/12 14:30	11/02/12 01:12	50-32-8	
Benzo(b)fluoranthene	ND ug/L		5.0	0.28	1	10/31/12 14:30	11/02/12 01:12	205-99-2	
Benzo(g,h,i)perylene	ND ug/L		5.0	0.38	1	10/31/12 14:30	11/02/12 01:12	191-24-2	
Benzo(k)fluoranthene	ND ug/L		5.0	0.43	1	10/31/12 14:30	11/02/12 01:12	207-08-9	
4-Bromophenylphenyl ether	ND ug/L		5.0	0.82	1	10/31/12 14:30	11/02/12 01:12	101-55-3	
Butylbenzylphthalate	ND ug/L		5.0	0.79	1	10/31/12 14:30	11/02/12 01:12	85-68-7	
4-Chloro-3-methylphenol	ND ug/L		5.0	3.7	1	10/31/12 14:30	11/02/12 01:12	59-50-7	
bis(2-Chloroethoxy)methane	ND ug/L		10.0	0.92	1	10/31/12 14:30	11/02/12 01:12	111-91-1	
bis(2-Chloroethyl) ether	ND ug/L		5.0	1.0	1	10/31/12 14:30	11/02/12 01:12	111-44-4	
bis(2-Chloroisopropyl) ether	ND ug/L		5.0	0.95	1	10/31/12 14:30	11/02/12 01:12	108-60-1	
2-Chloronaphthalene	ND ug/L		5.0	0.98	1	10/31/12 14:30	11/02/12 01:12	91-58-7	
2-Chlorophenol	ND ug/L		5.0	1.3	1	10/31/12 14:30	11/02/12 01:12	95-57-8	

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ANALYTICAL RESULTS

Project: STUART WWTP ATTACHMENT A

Pace Project No.: 92136754

Sample: OUTFALL 001GRAB Lab ID: 92136754001 Collected: 10/29/12 08:50 Received: 10/29/12 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
625 MSSV Analytical Method: EPA 625 Preparation Method: EPA 625									
4-Chlorophenyl/phenyl ether	ND	ug/L	5.0	0.87	1	10/31/12 14:30	11/02/12 01:12	7005-72-3	
Chrysene	ND	ug/L	5.0	0.21	1	10/31/12 14:30	11/02/12 01:12	218-01-9	
Dibenz(a,h)anthracene	ND	ug/L	5.0	0.55	1	10/31/12 14:30	11/02/12 01:12	53-70-3	
1,2-Dichlorobenzene	ND	ug/L	5.0	0.88	1	10/31/12 14:30	11/02/12 01:12	95-50-1	
1,3-Dichlorobenzene	ND	ug/L	5.0	0.81	1	10/31/12 14:30	11/02/12 01:12	541-73-1	
1,4-Dichlorobenzene	ND	ug/L	5.0	0.95	1	10/31/12 14:30	11/02/12 01:12	106-46-7	
3,3'-Dichlorobenzidine	ND	ug/L	25.0	2.1	1	10/31/12 14:30	11/02/12 01:12	91-94-1	
2,4-Dichlorophenol	ND	ug/L	5.0	1.7	1	10/31/12 14:30	11/02/12 01:12	120-83-2	
Diethylphthalate	ND	ug/L	5.0	0.58	1	10/31/12 14:30	11/02/12 01:12	84-66-2	
2,4-Dimethylphenol	ND	ug/L	10.0	1.2	1	10/31/12 14:30	11/02/12 01:12	105-67-9	
Dimethylphthalate	ND	ug/L	5.0	0.76	1	10/31/12 14:30	11/02/12 01:12	131-11-3	
Di-n-butylphthalate	ND	ug/L	5.0	0.75	1	10/31/12 14:30	11/02/12 01:12	84-74-2	
4,6-Dinitro-2-methylphenol	ND	ug/L	20.0	2.6	1	10/31/12 14:30	11/02/12 01:12	534-52-1	
2,4-Dinitrophenol	ND	ug/L	50.0	9.0	1	10/31/12 14:30	11/02/12 01:12	51-28-5	
2,4-Dinitrotoluene	ND	ug/L	5.0	0.90	1	10/31/12 14:30	11/02/12 01:12	121-14-2	
2,6-Dinitrotoluene	ND	ug/L	5.0	0.98	1	10/31/12 14:30	11/02/12 01:12	606-20-2	
Di-n-octylphthalate	ND	ug/L	5.0	0.66	1	10/31/12 14:30	11/02/12 01:12	117-84-0	
1,2-Diphenylhydrazine	ND	ug/L	5.0	0.90	1	10/31/12 14:30	11/02/12 01:12	122-66-7	
bis(2-Ethylhexyl)phthalate	5.9	ug/L	5.0	0.79	1	10/31/12 14:30	11/02/12 01:12	117-81-7	
Fluoranthene	ND	ug/L	5.0	0.21	1	10/31/12 14:30	11/02/12 01:12	206-44-0	
Fluorene	ND	ug/L	5.0	0.21	1	10/31/12 14:30	11/02/12 01:12	86-73-7	
Hexachloro-1,3-butadiene	ND	ug/L	5.0	0.94	1	10/31/12 14:30	11/02/12 01:12	87-68-3	
Hexachlorobenzene	ND	ug/L	5.0	0.72	1	10/31/12 14:30	11/02/12 01:12	118-74-1	
Hexachlorocyclopentadiene	ND	ug/L	10.0	0.88	1	10/31/12 14:30	11/02/12 01:12	77-47-4	
Hexachloroethane	ND	ug/L	5.0	1.1	1	10/31/12 14:30	11/02/12 01:12	67-72-1	
Indeno(1,2,3-cd)pyrene	ND	ug/L	5.0	0.29	1	10/31/12 14:30	11/02/12 01:12	193-39-5	
Isophorone	ND	ug/L	10.0	0.89	1	10/31/12 14:30	11/02/12 01:12	78-59-1	
Naphthalene	ND	ug/L	5.0	0.34	1	10/31/12 14:30	11/02/12 01:12	91-20-3	
Nitrobenzene	ND	ug/L	5.0	1.1	1	10/31/12 14:30	11/02/12 01:12	98-95-3	
2-Nitrophenol	ND	ug/L	5.0	0.91	1	10/31/12 14:30	11/02/12 01:12	88-75-5	
4-Nitrophenol	ND	ug/L	50.0	4.1	1	10/31/12 14:30	11/02/12 01:12	100-02-7	
N-Nitrosodimethylamine	ND	ug/L	5.0	0.91	1	10/31/12 14:30	11/02/12 01:12	62-75-9	
N-Nitroso-di-n-propylamine	ND	ug/L	5.0	0.99	1	10/31/12 14:30	11/02/12 01:12	621-64-7	
N-Nitrosodiphenylamine	ND	ug/L	10.0	1.0	1	10/31/12 14:30	11/02/12 01:12	86-30-6	
Pentachlorophenol	ND	ug/L	25.0	4.6	1	10/31/12 14:30	11/02/12 01:12	87-86-5	
Phenanthrene	ND	ug/L	5.0	0.22	1	10/31/12 14:30	11/02/12 01:12	85-01-8	
Phenol	ND	ug/L	5.0	1.9	1	10/31/12 14:30	11/02/12 01:12	108-95-2	
Pyrene	ND	ug/L	5.0	0.19	1	10/31/12 14:30	11/02/12 01:12	129-00-0	
1,2,4-Trichlorobenzene	ND	ug/L	5.0	0.98	1	10/31/12 14:30	11/02/12 01:12	120-82-1	
2,4,6-Trichlorophenol	ND	ug/L	10.0	1.3	1	10/31/12 14:30	11/02/12 01:12	88-06-2	
Surrogates									
Nitrobenzene-d5 (S)	60 %		10-120		1	10/31/12 14:30	11/02/12 01:12	4165-60-0	
2-Fluorobiphenyl (S)	59 %		15-120		1	10/31/12 14:30	11/02/12 01:12	321-60-8	
Terphenyl-d14 (S)	102 %		11-131		1	10/31/12 14:30	11/02/12 01:12	1718-51-0	
Phenol-d6 (S)	24 %		10-120		1	10/31/12 14:30	11/02/12 01:12	13127-88-3	
2-Fluorophenol (S)	33 %		10-120		1	10/31/12 14:30	11/02/12 01:12	367-12-4	

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(704)875-9092

ANALYTICAL RESULTS

Project: STUART WWTP ATTACHMENT A
Pace Project No.: 92136754

Sample: OUTFALL 001GRAB Lab ID: 92136754001 Collected: 10/29/12 08:50 Received: 10/29/12 11:10 Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
625 MSSV Analytical Method: EPA 625 Preparation Method: EPA 625									
Surrogates									
2,4,6-Tribromophenol (S)	73 %		10-137		1	10/31/12 14:30	11/02/12 01:12	118-79-6	
624 Volatile Organics Analytical Method: EPA 624									
Acrolein	ND ug/L		100	8.8	1		11/02/12 11:37	107-02-8	
Acrylonitrile	ND ug/L		100	11.5	1		11/02/12 11:37	107-13-1	
Benzene	ND ug/L		5.0	1.7	1		11/02/12 11:37	71-43-2	
Bromodichloromethane	2.0J ug/L		5.0	1.7	1		11/02/12 11:37	75-27-4	
Bromoform	ND ug/L		5.0	1.5	1		11/02/12 11:37	75-25-2	
Bromomethane	ND ug/L		10.0	2.5	1		11/02/12 11:37	74-83-9	
Carbon tetrachloride	ND ug/L		5.0	1.9	1		11/02/12 11:37	56-23-5	
Chlorobenzene	ND ug/L		5.0	1.7	1		11/02/12 11:37	108-90-7	
Chloroethane	ND ug/L		10.0	1.6	1		11/02/12 11:37	75-00-3	
2-Chloroethylvinyl ether	ND ug/L		10.0	2.2	1		11/02/12 11:37	110-75-8	
Chloroform	12.2 ug/L		5.0	1.9	1		11/02/12 11:37	67-66-3	
Dibromochloromethane	ND ug/L		5.0	1.8	1		11/02/12 11:37	124-48-1	
1,1-Dichloroethane	ND ug/L		5.0	1.8	1		11/02/12 11:37	75-34-3	
1,2-Dichloroethane	ND ug/L		5.0	1.8	1		11/02/12 11:37	107-06-2	
1,1-Dichloroethene	ND ug/L		5.0	1.9	1		11/02/12 11:37	75-35-4	
trans-1,2-Dichloroethene	ND ug/L		5.0	1.8	1		11/02/12 11:37	156-60-5	
1,2-Dichloropropane	ND ug/L		5.0	1.7	1		11/02/12 11:37	78-87-5	
cis-1,3-Dichloropropene	ND ug/L		5.0	1.6	1		11/02/12 11:37	10061-01-5	
trans-1,3-Dichloropropene	ND ug/L		5.0	1.6	1		11/02/12 11:37	10061-02-6	
Ethylbenzene	ND ug/L		5.0	1.6	1		11/02/12 11:37	100-41-4	
Methylene Chloride	ND ug/L		5.0	1.9	1		11/02/12 11:37	75-09-2	
1,1,2,2-Tetrachloroethane	ND ug/L		5.0	1.5	1		11/02/12 11:37	79-34-5	
Tetrachloroethene	ND ug/L		5.0	1.8	1		11/02/12 11:37	127-18-4	
Toluene	ND ug/L		5.0	1.6	1		11/02/12 11:37	108-88-3	
1,1,1-Trichloroethane	ND ug/L		5.0	1.9	1		11/02/12 11:37	71-55-6	
1,1,2-Trichloroethane	ND ug/L		5.0	1.7	1		11/02/12 11:37	79-00-5	
Trichloroethene	ND ug/L		5.0	1.8	1		11/02/12 11:37	79-01-6	
Vinyl chloride	ND ug/L		5.0	1.5	1		11/02/12 11:37	75-01-4	
Surrogates									
Dibromofluoromethane (S)	93 %		70-130		1		11/02/12 11:37	1868-53-7	
4-Bromofluorobenzene (S)	110 %		70-130		1		11/02/12 11:37	460-00-4	
Toluene-d8 (S)	96 %		70-130		1		11/02/12 11:37	2037-26-5	
1,2-Dichloroethane-d4 (S)	108 %		70-130		1		11/02/12 11:37	17060-07-0	
4500S2D Sulfide Water Analytical Method: SM 4500-S2D									
Sulfide	ND mg/L		0.10	0.10	1		11/03/12 13:35	18496-25-8	
4500CNE Cyanide, Total Analytical Method: SM 4500-CN-E									
Cyanide	ND mg/L		0.0050	0.0050	1		11/11/12 14:11	57-12-5	

Date: 11/14/2012 04:08 PM

REPORT OF LABORATORY ANALYSIS

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(704)875-9092

ANALYTICAL RESULTS

Project: STUART WWTP ATTACHMENT A

Pace Project No.: 92136754

Sample: OUTFALL 001COMP

Lab ID: 92136754002

Collected: 10/29/12 09:00

Received: 10/29/12 11:10

Matrix: Water

Parameters	Results	Units	Report Limit	MDL	DF	Prepared	Analyzed	CAS No.	Qual
350.1-Ammonia									
Analytical Method: EPA 350.1									
Nitrogen, Ammonia	0.17	mg/L	0.10	0.10	1		11/05/12 18:30	7664-41-7	

QUALIFIERS

Project: STUART WWTP ATTACHMENT A
Pace Project No.: 92136754

DEFINITIONS

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to changes in sample preparation, dilution of the sample aliquot, or moisture content.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PRL - Pace Reporting Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine (8270 listed analyte) decomposes to Azobenzene.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

DUP - Sample Duplicate

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Acid preservation may not be appropriate for 2-Chloroethylvinyl ether, Styrene, and Vinyl chloride.

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

LABORATORIES

PASI-A Pace Analytical Services - Asheville
PASI-C Pace Analytical Services - Charlotte
PASI-E Pace Analytical Services - Eden
PASI-O Pace Analytical Services - Ormond Beach

BATCH QUALIFIERS

Batch: GCSV7189

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

Batch: GCSV7222

[M5] A matrix spike/matrix spike duplicate was not performed for this batch due to insufficient sample volume.

ANALYTE QUALIFIERS

D6 The relative percent difference (RPD) between the sample and sample duplicate exceeded laboratory control limits.
L0 Analyte recovery in the laboratory control sample (LCS) was outside QC limits.
L2 Analyte recovery in the laboratory control sample (LCS) was below QC limits. Results for this analyte in associated samples may be biased low.
M0 Matrix spike recovery and/or matrix spike duplicate recovery was outside laboratory control limits.
M1 Matrix spike recovery exceeded QC limits. Batch accepted based on laboratory control sample (LCS) recovery.
P5 The EPA or method required sample preservation degrades this compound, therefore acceptable recoveries may not be achieved in sample matrix spikes.
R1 RPD value was outside control limits.



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QUALIFIERS

Project: STUART WWTP ATTACHMENT A
Pace Project No.: 92136754

ANALYTE QUALIFIERS

R2 RPD value was outside control limits due to matrix interference

ANALYTICAL DATA REPORT

UL ORDER ID **1210532**

UL Sample Number **1210532-001**

Sample Site: **OUTFALL 001 GRAB**

Grab Date/Time: **10/29/2012 08:50:00**

Client Sample ID: **92136754001**

Composite Start: **N/A**

Sample Matrix: **Wastewater**

Composite Stop: **N/A**

Collected By: **CLIENT**

Parameter	Test Result	Units	RL	Analysis Date/Time	Location	Comment
GC/FPD						
TBT Tributyltin	<0.03	ug/L	0.03	11/6/2012 18:18:00	HAM	

Comments for 1210532-001

No comments

Attachment G

Wasteload and Limit Calculations

- **Mixing Zone Output (MIXER)**
- **Wasteload Allocation Spreadsheet**
- **STATS Program Results**

Mixing Zone Predictions for Town of Stuart WWTP

Effluent Flow = 0.60 MGD
Stream 7Q10 = 10 MGD
Stream 30Q10 = 7.8 MGD
Stream 1Q10 = 5.5 MGD
Stream slope = 0.0037 ft/ft
Stream width = 40 ft
Bottom scale = 3
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = .6667 ft
Length = 2095.37 ft
Velocity = .6152 ft/sec
Residence Time = .0394 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = .5789 ft
Length = 2363.79 ft
Velocity = .5615 ft/sec
Residence Time = .0487 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = .4768 ft
Length = 2787.7 ft
Velocity = .4951 ft/sec
Residence Time = 1.5642 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 63.93% of the 1Q10 is used.

FRESHWATER WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS

Facility Name: Town of Stuart WWTP

Permit No.: VA0022985

Receiving Stream: South Mayo River

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO3) =	25 mg/L
90% Temperature (Annual) =	20.9 deg C
90% Temperature (Wet season) =	19.8 deg C
90% Maximum pH =	8.3 SU
10% Maximum pH =	6.9 SU
Tier Designation (1 or 2) =	2
Public Water Supply (PWS) Y/N? =	n
Trout Present Y/N? =	n
Early Life Stages Present Y/N? =	y

Stream Flows

1Q10 (Annual) =	5.5 MGD
7Q10 (Annual) =	6.1 MGD
30Q10 (Annual) =	7.8 MGD
1Q10 (Wet season) =	8.8 MGD
30Q10 (Wet season) =	13 MGD
30Q5 =	9.5 MGD
Harmonic Mean =	21 MGD

Mixing Information

Annual - 1Q10 Mix =	63.93 %
- 7Q10 Mix =	100 %
- 30Q10 Mix =	100 %
Wet Season - 1Q10 Mix =	100 %
- 30Q10 Mix =	100 %

Effluent Information

Mean Hardness (as CaCO3) =	94 mg/L
90% Temp (Annual) =	27.4 deg C
90% Temp (Wet season) =	25.9 deg C
90% Maximum pH =	7 SU
10% Maximum pH =	6 SU
Discharge Flow =	0.6 MGD

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Acenaphthene	0	--	--	na	9.9E+02	--	--	na	1.7E+04	--	--	na	9.9E+01	--	--	na	1.7E+03	--	--	na	1.7E+03
Acrolein	0	--	--	na	9.3E+00	--	--	na	1.6E+02	--	--	na	9.3E-01	--	--	na	1.6E+01	--	--	na	1.6E+01
Acrylonitrile ^C	0	--	--	na	2.5E+00	--	--	na	9.0E+01	--	--	na	2.5E-01	--	--	na	9.0E+00	--	--	na	9.0E+00
Aldrin ^C	0	3.0E+00	--	na	5.0E-04	2.1E+01	--	na	1.8E-02	7.5E-01	--	na	5.0E-05	7.6E+00	--	na	1.8E-03	7.6E+00	--	na	1.8E-03
Ammonia-N (mg/l) (Yearly)	0	1.38E+01	1.73E+00	na	--	9.5E+01	2.4E+01	na	--	2.81E+00	4.33E-01	na	--	2.9E+01	6.1E+00	na	--	2.9E+01	6.1E+00	na	--
Ammonia-N (mg/l) (High Flow)	0	9.14E+00	1.61E+00	na	--	1.4E+02	3.7E+01	na	--	2.28E+00	4.04E-01	na	--	3.6E+01	9.1E+00	na	--	3.6E+01	9.1E+00	na	--
Anthracene	0	--	--	na	4.0E+04	--	--	na	6.7E+05	--	--	na	4.0E+03	--	--	na	6.7E+04	--	--	na	6.7E+04
Antimony	0	--	--	na	6.4E+02	--	--	na	1.1E+04	--	--	na	6.4E+01	--	--	na	1.1E+03	--	--	na	1.1E+03
Arsenic	0	3.4E+02	1.5E+02	na	--	2.3E+03	1.7E+03	na	--	8.5E+01	3.8E+01	na	--	8.6E+02	4.2E+02	na	--	8.6E+02	4.2E+02	na	--
Barium	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Benzene ^C	0	--	--	na	5.1E+02	--	--	na	1.8E+04	--	--	na	5.1E+01	--	--	na	1.8E+03	--	--	na	1.8E+03
Benzidine ^C	0	--	--	na	2.0E-03	--	--	na	7.2E-02	--	--	na	2.0E-04	--	--	na	7.2E-03	--	--	na	7.2E-03
Benzo (a) anthracene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
Benzo (b) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
Benzo (k) fluoranthene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
Benzo (a) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
Bis(2-Chloroethyl) Ether ^C	0	--	--	na	5.3E+00	--	--	na	1.9E+02	--	--	na	5.3E-01	--	--	na	1.9E+01	--	--	na	1.9E+01
Bis(2-Chloroisopropyl) Ether	0	--	--	na	6.5E+04	--	--	na	1.1E+06	--	--	na	6.5E+03	--	--	na	1.1E+05	--	--	na	1.1E+05
Bis 2-Ethylhexyl Phthalate ^C	0	--	--	na	2.2E+01	--	--	na	7.9E+02	--	--	na	2.2E+00	--	--	na	7.9E+01	--	--	na	7.9E+01
Bromoform ^C	0	--	--	na	1.4E+03	--	--	na	5.0E+04	--	--	na	1.4E+02	--	--	na	5.0E+03	--	--	na	5.0E+03
Butylbenzylphthalate	0	--	--	na	1.9E+03	--	--	na	3.2E+04	--	--	na	1.9E+02	--	--	na	3.2E+03	--	--	na	3.2E+03
Cadmium	0	1.2E+00	4.5E-01	na	--	8.2E+00	5.1E+00	na	--	2.7E-01	1.1E-01	na	--	2.7E+00	1.3E+00	na	--	2.7E+00	1.3E+00	na	--
Carbon Tetrachloride ^C	0	--	--	na	1.6E+01	--	--	na	5.8E+02	--	--	na	1.6E+00	--	--	na	5.8E+01	--	--	na	5.8E+01
Chlordane ^C	0	2.4E+00	4.3E-03	na	8.1E-03	1.6E+01	4.8E-02	na	2.9E-01	6.0E-01	1.1E-03	na	8.1E-04	6.1E+00	1.2E-02	na	2.9E-02	6.1E+00	1.2E-02	na	2.9E-02
Chloride	0	8.6E+05	2.3E+05	na	--	5.9E+06	2.6E+06	na	--	2.2E+05	5.8E+04	na	--	2.2E+06	6.4E+05	na	--	2.2E+06	6.4E+05	na	--
TRC	0	1.9E+01	1.1E+01	na	--	1.3E+02	1.2E+02	na	--	4.8E+00	2.8E+00	na	--	4.8E+01	3.1E+01	na	--	4.8E+01	3.1E+01	na	--
Chlorobenzene	0	--	--	na	1.6E+03	--	--	na	2.7E+04	--	--	na	1.6E+02	--	--	na	2.7E+03	--	--	na	2.7E+03

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Chlorodibromomethane ^C	0	--	--	na	1.3E+02	--	--	na	4.7E+03	--	--	na	1.3E+01	--	--	na	4.7E+02	--	--	na	4.7E+02
Chloroform	0	--	--	na	1.1E+04	--	--	na	1.9E+05	--	--	na	1.1E+03	--	--	na	1.9E+04	--	--	na	1.9E+04
2-Chloronaphthalene	0	--	--	na	1.6E+03	--	--	na	2.7E+04	--	--	na	1.6E+02	--	--	na	2.7E+03	--	--	na	2.7E+03
2-Chlorophenol	0	--	--	na	1.5E+02	--	--	na	2.5E+03	--	--	na	1.5E+01	--	--	na	2.5E+02	--	--	na	2.5E+02
Chlorpyrifos	0	8.3E-02	4.1E-02	na	--	5.7E-01	4.6E-01	na	--	2.1E-02	1.0E-02	na	--	2.1E-01	1.1E-01	na	--	2.1E-01	1.1E-01	na	--
Chromium III	0	2.4E+02	2.9E+01	na	--	1.7E+03	3.2E+02	na	--	5.6E+01	7.1E+00	na	--	5.7E+02	8.0E+01	na	--	5.7E+02	8.0E+01	na	--
Chromium VI	0	1.6E+01	1.1E+01	na	--	1.1E+02	1.2E+02	na	--	4.0E+00	2.8E+00	na	--	4.1E+01	3.1E+01	na	--	4.1E+01	3.1E+01	na	--
Chromium, Total	0	--	--	1.0E+02	--	--	--	na	--	--	--	1.0E+01	--	--	--	1.7E+02	--	--	--	na	--
Chrysene ^C	0	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	1.8E-03	--	--	na	6.5E-02	--	--	na	6.5E-02
Copper	0	5.0E+00	3.3E+00	na	--	3.4E+01	3.7E+01	na	--	1.1E+00	8.3E-01	na	--	1.2E+01	9.2E+00	na	--	1.2E+01	9.2E+00	na	--
Cyanide, Free	0	2.2E+01	5.2E+00	na	1.6E+04	1.5E+02	5.8E+01	na	2.7E+05	5.5E+00	1.3E+00	na	1.6E+03	5.6E+01	1.5E+01	na	2.7E+04	5.6E+01	1.5E+01	na	2.7E+04
DDD ^C	0	--	--	na	3.1E-03	--	--	na	1.1E-01	--	--	na	3.1E-04	--	--	na	1.1E-02	--	--	na	1.1E-02
DDE ^C	0	--	--	na	2.2E-03	--	--	na	7.9E-02	--	--	na	2.2E-04	--	--	na	7.9E-03	--	--	na	7.9E-03
DDT ^C	0	1.1E+00	1.0E-03	na	2.2E-03	7.5E+00	1.1E-02	na	7.9E-02	2.8E-01	2.5E-04	na	2.2E-04	2.8E+00	2.8E-03	na	7.9E-03	2.8E+00	2.8E-03	na	7.9E-03
Demeton	0	--	1.0E-01	na	--	--	1.1E+00	na	--	--	2.5E-02	na	--	--	2.8E-01	na	--	--	2.8E-01	na	--
Diazinon	0	1.7E-01	1.7E-01	na	--	1.2E+00	1.9E+00	na	--	4.3E-02	4.3E-02	na	--	4.3E-01	4.7E-01	na	--	4.3E-01	4.7E-01	na	--
Dibenz(a,h)anthracene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
1,2-Dichlorobenzene	0	--	--	na	1.3E+03	--	--	na	2.2E+04	--	--	na	1.3E+02	--	--	na	2.2E+03	--	--	na	2.2E+03
1,3-Dichlorobenzene	0	--	--	na	9.6E+02	--	--	na	1.6E+04	--	--	na	9.6E+01	--	--	na	1.6E+03	--	--	na	1.6E+03
1,4-Dichlorobenzene	0	--	--	na	1.9E+02	--	--	na	3.2E+03	--	--	na	1.9E+01	--	--	na	3.2E+02	--	--	na	3.2E+02
3,3-Dichlorobenzidine ^C	0	--	--	na	2.8E-01	--	--	na	1.0E+01	--	--	na	2.8E-02	--	--	na	1.0E+00	--	--	na	1.0E+00
Dichlorobromomethane ^C	0	--	--	na	1.7E+02	--	--	na	6.1E+03	--	--	na	1.7E+01	--	--	na	6.1E+02	--	--	na	6.1E+02
1,2-Dichloroethane ^C	0	--	--	na	3.7E+02	--	--	na	1.3E+04	--	--	na	3.7E+01	--	--	na	1.3E+03	--	--	na	1.3E+03
1,1-Dichloroethylene	0	--	--	na	7.1E+03	--	--	na	1.2E+05	--	--	na	7.1E+02	--	--	na	1.2E+04	--	--	na	1.2E+04
1,2-trans-dichloroethylene	0	--	--	na	1.0E+04	--	--	na	1.7E+05	--	--	na	1.0E+03	--	--	na	1.7E+04	--	--	na	1.7E+04
2,4-Dichlorophenol	0	--	--	na	2.9E+02	--	--	na	4.9E+03	--	--	na	2.9E+01	--	--	na	4.9E+02	--	--	na	4.9E+02
2,4-Dichlorophenoxy acetic acid (2,4-D)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,2-Dichloropropane ^C	0	--	--	na	1.5E+02	--	--	na	5.4E+03	--	--	na	1.5E+01	--	--	na	5.4E+02	--	--	na	5.4E+02
1,3-Dichloropropene ^C	0	--	--	na	2.1E+02	--	--	na	7.6E+03	--	--	na	2.1E+01	--	--	na	7.6E+02	--	--	na	7.6E+02
Dieldrin ^C	0	2.4E-01	5.6E-02	na	5.4E-04	1.6E+00	6.3E-01	na	1.9E-02	6.0E-02	1.4E-02	na	5.4E-05	6.1E-01	1.6E-01	na	1.9E-03	6.1E-01	1.6E-01	na	1.9E-03
Diethyl Phthalate	0	--	--	na	4.4E+04	--	--	na	7.4E+05	--	--	na	4.4E+03	--	--	na	7.4E+04	--	--	na	7.4E+04
2,4-Dimethylphenol	0	--	--	na	8.5E+02	--	--	na	1.4E+04	--	--	na	8.5E+01	--	--	na	1.4E+03	--	--	na	1.4E+03
Dimethyl Phthalate	0	--	--	na	1.1E+06	--	--	na	1.9E+07	--	--	na	1.1E+05	--	--	na	1.9E+06	--	--	na	1.9E+06
Di-n-Butyl Phthalate	0	--	--	na	4.5E+03	--	--	na	7.6E+04	--	--	na	4.5E+02	--	--	na	7.6E+03	--	--	na	7.6E+03
2,4 Dinitrophenol	0	--	--	na	5.3E+03	--	--	na	8.9E+04	--	--	na	5.3E+02	--	--	na	8.9E+03	--	--	na	8.9E+03
2-Methyl-4,6-Dinitrophenol	0	--	--	na	2.8E+02	--	--	na	4.7E+03	--	--	na	2.8E+01	--	--	na	4.7E+02	--	--	na	4.7E+02
2,4-Dinitrotoluene ^C	0	--	--	na	3.4E+01	--	--	na	1.2E+03	--	--	na	3.4E+00	--	--	na	1.2E+02	--	--	na	1.2E+02
Dioxin 2,3,7,8- tetrachlorodibenzo-p-dioxin	0	--	--	na	5.1E-08	--	--	na	8.6E-07	--	--	na	5.1E-09	--	--	na	8.6E-08	--	--	na	8.6E-08
1,2-Diphenylhydrazine ^C	0	--	--	na	2.0E+00	--	--	na	7.2E+01	--	--	na	2.0E-01	--	--	na	7.2E+00	--	--	na	7.2E+00
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.5E+00	6.3E-01	na	1.5E+03	5.5E-02	1.4E-02	na	8.9E+00	5.6E-01	1.6E-01	na	1.5E+02	5.6E-01	1.6E-01	na	1.5E+02
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	8.9E+01	1.5E+00	6.3E-01	na	1.5E+03	5.5E-02	1.4E-02	na	8.9E+00	5.6E-01	1.6E-01	na	1.5E+02	5.6E-01	1.6E-01	na	1.5E+02
Alpha + Beta Endosulfan	0	2.2E-01	5.6E-02	--	--	1.5E+00	6.3E-01	--	--	5.5E-02	1.4E-02	--	--	5.6E-01	1.6E-01	--	--	5.6E-01	1.6E-01	--	--
Endosulfan Sulfate	0	--	--	na	8.9E+01	--	--	na	1.5E+03	--	--	na	8.9E+00	--	--	na	1.5E+02	--	--	na	1.5E+02
Endrin	0	8.6E-02	3.6E-02	na	6.0E-02	5.9E-01	4.0E-01	na	1.0E+00	2.2E-02	9.0E-03	na	6.0E-03	2.2E-01	1.0E-01	na	1.0E-01	2.2E-01	1.0E-01	na	1.0E-01
Endrin Aldehyde	0	--	--	na	3.0E-01	--	--	na	5.1E+00	--	--	na	3.0E-02	--	--	na	5.1E-01	--	--	na	5.1E-01

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Ethylbenzene	0	--	--	na	2.1E+03	--	--	na	3.5E+04	--	--	na	2.1E+02	--	--	na	3.5E+03	--	--	na	3.5E+03
Fluoranthene	0	--	--	na	1.4E+02	--	--	na	2.4E+03	--	--	na	1.4E+01	--	--	na	2.4E+02	--	--	na	2.4E+02
Fluorene	0	--	--	na	5.3E+03	--	--	na	8.9E+04	--	--	na	5.3E+02	--	--	na	8.9E+03	--	--	na	8.9E+03
Foaming Agents	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Guthion	0	--	1.0E-02	na	--	--	1.1E-01	na	--	--	2.5E-03	na	--	--	2.8E-02	na	--	--	2.8E-02	na	--
Heptachlor ^C	0	5.2E-01	3.8E-03	na	7.9E-04	3.6E+00	4.2E-02	na	2.8E-02	1.3E-01	9.5E-04	na	7.9E-05	1.3E+00	1.1E-02	na	2.8E-03	1.3E+00	1.1E-02	na	2.8E-03
Heptachlor Epoxide ^C	0	5.2E-01	3.8E-03	na	3.9E-04	3.6E+00	4.2E-02	na	1.4E-02	1.3E-01	9.5E-04	na	3.9E-05	1.3E+00	1.1E-02	na	1.4E-03	1.3E+00	1.1E-02	na	1.4E-03
Hexachlorobenzene ^C	0	--	--	na	2.9E-03	--	--	na	1.0E-01	--	--	na	2.9E-04	--	--	na	1.0E-02	--	--	na	1.0E-02
Hexachlorobutadiene ^C	0	--	--	na	1.8E+02	--	--	na	6.5E+03	--	--	na	1.8E+01	--	--	na	6.5E+02	--	--	na	6.5E+02
Hexachlorocyclohexane																					
Alpha-BHC ^C	0	--	--	na	4.9E-02	--	--	na	1.8E+00	--	--	na	4.9E-03	--	--	na	1.8E-01	--	--	na	1.8E-01
Hexachlorocyclohexane																					
Beta-BHC ^C	0	--	--	na	1.7E-01	--	--	na	6.1E+00	--	--	na	1.7E-02	--	--	na	6.1E-01	--	--	na	6.1E-01
Hexachlorocyclohexane																					
Gamma-BHC ^C (Lindane)	0	9.5E-01	na	na	1.8E+00	6.5E+00	--	na	6.5E+01	2.4E-01	--	na	1.8E-01	2.4E+00	--	na	6.5E+00	2.4E+00	--	na	6.5E+00
Hexachlorocyclopentadiene	0	--	--	na	1.1E+03	--	--	na	1.9E+04	--	--	na	1.1E+02	--	--	na	1.9E+03	--	--	na	1.9E+03
Hexachloroethane ^C	0	--	--	na	3.3E+01	--	--	na	1.2E+03	--	--	na	3.3E+00	--	--	na	1.2E+02	--	--	na	1.2E+02
Hydrogen Sulfide	0	--	2.0E+00	na	--	--	2.2E+01	na	--	--	5.0E-01	na	--	--	5.6E+00	na	--	--	5.6E+00	na	--
Indeno (1,2,3-cd) pyrene ^C	0	--	--	na	1.8E-01	--	--	na	6.5E+00	--	--	na	1.8E-02	--	--	na	6.5E-01	--	--	na	6.5E-01
Iron	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Isophorone ^C	0	--	--	na	9.6E+03	--	--	na	3.5E+05	--	--	na	9.6E+02	--	--	na	3.5E+04	--	--	na	3.5E+04
Kepone	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Lead	0	3.1E+01	3.1E+00	na	--	2.1E+02	3.4E+01	na	--	6.9E+00	7.7E-01	na	--	7.0E+01	8.6E+00	na	--	7.0E+01	8.6E+00	na	--
Malathion	0	--	1.0E-01	na	--	--	1.1E+00	na	--	--	2.5E-02	na	--	--	2.8E-01	na	--	--	2.8E-01	na	--
Manganese	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Mercury	0	1.4E+00	7.7E-01	--	--	9.6E+00	8.6E+00	--	--	3.5E-01	1.9E-01	--	--	3.6E+00	2.1E+00	--	--	3.6E+00	2.1E+00	--	--
Methyl Bromide	0	--	--	na	1.5E+03	--	--	na	2.5E+04	--	--	na	1.5E+02	--	--	na	2.5E+03	--	--	na	2.5E+03
Methylene Chloride ^C	0	--	--	na	5.9E+03	--	--	na	2.1E+05	--	--	na	5.9E+02	--	--	na	2.1E+04	--	--	na	2.1E+04
Methoxychlor	0	--	3.0E-02	na	--	--	3.4E-01	na	--	--	7.5E-03	na	--	--	8.4E-02	na	--	--	8.4E-02	na	--
Mirex	0	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--	--	0.0E+00	na	--
Nickel	0	7.5E+01	7.6E+00	na	4.6E+03	5.2E+02	8.4E+01	na	7.7E+04	1.7E+01	1.9E+00	na	4.6E+02	1.8E+02	2.1E+01	na	7.7E+03	1.8E+02	2.1E+01	na	7.7E+03
Nitrate (as N)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Nitrobenzene	0	--	--	na	6.9E+02	--	--	na	1.2E+04	--	--	na	6.9E+01	--	--	na	1.2E+03	--	--	na	1.2E+03
N-Nitrosodimethylamine ^C	0	--	--	na	3.0E+01	--	--	na	1.1E+03	--	--	na	3.0E+00	--	--	na	1.1E+02	--	--	na	1.1E+02
N-Nitrosodiphenylamine ^C	0	--	--	na	6.0E+01	--	--	na	2.2E+03	--	--	na	6.0E+00	--	--	na	2.2E+02	--	--	na	2.2E+02
N-Nitrosodi-n-propylamine ^C	0	--	--	na	5.1E+00	--	--	na	1.8E+02	--	--	na	5.1E-01	--	--	na	1.8E+01	--	--	na	1.8E+01
Nonylphenol	0	2.8E+01	6.6E+00	--	--	1.9E+02	7.4E+01	na	--	7.0E+00	1.7E+00	--	--	7.1E+01	1.8E+01	--	--	7.1E+01	1.8E+01	na	--
Parathion	0	6.5E-02	1.3E-02	na	--	4.5E-01	1.5E-01	na	--	1.6E-02	3.3E-03	na	--	1.7E-01	3.6E-02	na	--	1.7E-01	3.6E-02	na	--
PCB Total ^C	0	--	1.4E-02	na	6.4E-04	--	1.6E-01	na	2.3E-02	--	3.5E-03	na	6.4E-05	--	3.9E-02	na	2.3E-03	--	3.9E-02	na	2.3E-03
Pentachlorophenol ^C	0	5.8E+00	4.9E+00	na	3.0E+01	4.0E+01	5.5E+01	na	1.1E+03	1.6E+00	1.2E+00	na	3.0E+00	1.6E+01	1.4E+01	na	1.1E+02	1.6E+01	1.4E+01	na	1.1E+02
Phenol	0	--	--	na	8.6E+05	--	--	na	1.4E+07	--	--	na	8.6E+04	--	--	na	1.4E+06	--	--	na	1.4E+06
Pyrene	0	--	--	na	4.0E+03	--	--	na	6.7E+04	--	--	na	4.0E+02	--	--	na	6.7E+03	--	--	na	6.7E+03
Radionuclides																					
Gross Alpha Activity (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Beta and Photon Activity (mrem/yr)	0	--	--	na	4.0E+00	--	--	na	6.7E+01	--	--	na	4.0E-01	--	--	na	6.7E+00	--	--	na	6.7E+00
Radium 226 + 228 (pCi/L)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Uranium (ug/l)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria				Wasteload Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Selenium, Total Recoverable	0	2.0E+01	5.0E+00	na	4.2E+03	1.4E+02	5.6E+01	na	7.1E+04	5.0E+00	1.3E+00	na	4.2E+02	5.1E+01	1.4E+01	na	7.1E+03	5.1E+01	1.4E+01	na	7.1E+03
Silver	0	5.7E-01	--	na	--	3.9E+00	--	na	--	1.2E-01	--	na	--	1.2E+00	--	na	--	1.2E+00	--	na	--
Sulfate	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^C	0	--	--	na	4.0E+01	--	--	na	1.4E+03	--	--	na	4.0E+00	--	--	na	1.4E+02	--	--	na	1.4E+02
Tetrachloroethylene ^C	0	--	--	na	3.3E+01	--	--	na	1.2E+03	--	--	na	3.3E+00	--	--	na	1.2E+02	--	--	na	1.2E+02
Thallium	0	--	--	na	4.7E-01	--	--	na	7.9E+00	--	--	na	4.7E-02	--	--	na	7.9E-01	--	--	na	7.9E-01
Toluene	0	--	--	na	6.0E+03	--	--	na	1.0E+05	--	--	na	6.0E+02	--	--	na	1.0E+04	--	--	na	1.0E+04
Total dissolved solids	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene ^C	0	7.3E-01	2.0E-04	na	2.8E-03	5.0E+00	2.2E-03	na	1.0E-01	1.8E-01	5.0E-05	na	2.8E-04	1.9E+00	5.6E-04	na	1.0E-02	1.9E+00	5.6E-04	na	1.0E-02
Tributyltin	0	4.6E-01	7.2E-02	na	--	3.2E+00	8.0E-01	na	--	1.2E-01	1.8E-02	na	--	1.2E+00	2.0E-01	na	--	1.2E+00	2.0E-01	na	--
1,2,4-Trichlorobenzene	0	--	--	na	7.0E+01	--	--	na	1.2E+03	--	--	na	7.0E+00	--	--	na	1.2E+02	--	--	na	1.2E+02
1,1,2-Trichloroethane ^C	0	--	--	na	1.6E+02	--	--	na	5.8E+03	--	--	na	1.6E+01	--	--	na	5.8E+02	--	--	na	5.8E+02
Trichloroethylene ^C	0	--	--	na	3.0E+02	--	--	na	1.1E+04	--	--	na	3.0E+01	--	--	na	1.1E+03	--	--	na	1.1E+03
2,4,6-Trichlorophenol ^C	0	--	--	na	2.4E+01	--	--	na	8.6E+02	--	--	na	2.4E+00	--	--	na	8.6E+01	--	--	na	8.6E+01
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Vinyl Chloride ^C	0	--	--	na	2.4E+01	--	--	na	8.6E+02	--	--	na	2.4E+00	--	--	na	8.6E+01	--	--	na	8.6E+01
Zinc	0	4.8E+01	4.4E+01	na	2.6E+04	3.3E+02	4.9E+02	na	4.4E+05	1.1E+01	1.1E+01	na	2.6E+03	1.1E+02	1.2E+02	na	4.4E+04	1.1E+02	1.2E+02	na	4.4E+04

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipals
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information.
Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
= (0.1(WQC - background conc.) + background conc.) for human health
- WLAs established at the following stream flows: 1Q10 for Acute, 30Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 30Q5 for Non-carcinogens and Harmonic Mean for Carcinogens. To apply mixing ratios from a model set the stream flow equal to (mixing ratio - 1), effluent flow equal to 1 and 100% mix.

Metal	Target Value (SSTV)
Antimony	1.1E+03
Arsenic	2.5E+02
Barium	na
Cadmium	7.6E-01
Chromium III	4.8E+01
Chromium VI	1.6E+01
Copper	4.6E+00
Iron	na
Lead	5.1E+00
Manganese	na
Mercury	1.3E+00
Nickel	1.3E+01
Selenium	8.4E+00
Silver	4.9E-01
Zinc	4.5E+01

Note: do not use QL's lower than the minimum QL's provided in agency guidance

1/31/2013 10:32:09 AM

Facility = Stuart WWTP
Chemical = copper, dissolved (ug/L)
Chronic averaging period = 4
WLAa = 34
WLAc = 37
Q.L. = 5.0
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 7
Expected Value = 8.94285
Variance = 28.7908
C.V. = 0.6
97th percentile daily values = 21.7617
97th percentile 4 day average = 14.8790
97th percentile 30 day average = 10.7855
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

7
8
9.6
10.8
9.3
10.3
7.6

1/31/2013 10:33:54 AM

Facility = Stuart WWTP
Chemical = zinc, dissolved
Chronic averaging period = 4
WLAa = 330
WLAc = 490
Q.L. = 10
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 7
Expected Value = 124.942
Variance = 5619.85
C.V. = 0.6
97th percentile daily values = 304.038
97th percentile 4 day average = 207.878
97th percentile 30 day average = 150.687
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

129
156
143
117
120
125
84.6

1/31/2013 10:15:03 AM

Facility = Town of Stuart WWTP

Chemical = TRC (ug/L)

Chronic averaging period = 4

WLAa = 130

WLAc = 120

Q.L. = 100

samples/mo. = 90

samples/wk. = 23

Summary of Statistics:

observations = 1

Expected Value = 1000

Variance = 360000

C.V. = 0.6

97th percentile daily values = 2433.41

97th percentile 4 day average = 1663.79

97th percentile 30 day average = 1206.05

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 130

Average Weekly limit = 67.013129350922

Average Monthly Limit = 59.7782475075477

$$67 \mu\text{g/L} = 0.067 \text{ mg/L}$$
$$60 \mu\text{g/L} = 0.060 \text{ mg/L}$$

The data are:

1000

1/31/2013 10:12:22 AM

Facility = Town of Stuart WWTP

Chemical = chloroform (ug/L)

Chronic averaging period = 4

WLAa = 190000

WLAc = 190000

Q.L. = 5.0

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 12.2

Variance = 53.5824

C.V. = 0.6

97th percentile daily values = 29.6876

97th percentile 4 day average = 20.2982

97th percentile 30 day average = 14.7138

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

12.2

1/31/2013 10:13:56 AM

Facility = Town of Stuart WWTP

Chemical = ammonia (mg/L)

Chronic averaging period = 30

WLAa = 95

WLAc = 24

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average = 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

1/31/2013 9:46:57 AM

Facility = Town of Stuart WWTP

Chemical = selenium, dissolved

Chronic averaging period = 4

WLAa = 140

WLAc = 56

Q.L. = 10

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 10

Variance = 36

C.V. = 0.6

97th percentile daily values = 24.3341

97th percentile 4 day average = 16.6379

97th percentile 30 day average = 12.0605

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

10

Attachment H

Reduced Monitoring Evaluation Memorandum

MEMORANDUM


DEPARTMENT OF ENVIRONMENTAL QUALITY *Blue Ridge Regional Office*

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Justification for Reduced Monitoring Frequency
Reissuance of VPDES Permit No. VA0022985
Town of Stuart WWTP

TO: Permit File

FROM: Becky L. France, Water Permit Writer 

DATE: February 28, 2013

Compliance History

The VPDES Permit Manual recommends effluent monitoring frequencies. In the previous permit term, the treatment facility qualified for reduced monitoring frequencies. Guidance Memo 98-2005 allows for reduced monitoring at facilities with excellent compliance histories.

To qualify for consideration of reduced monitoring, the facility should not have been issued any Letter of Noncompliance (LON), Notice of Violation (NOV), Warning Letter, or Unsatisfactory Laboratory Determinations, or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

The facility received the following Warning Letters within the past three years:

Warning Letter No. W2013-01-W-1001	failure to submit annual sludge report
Warning Letter No. W2012-04-W-1001	failure to submit annual TMP report

Sludge was not land apply sludge during 2012 and the permittee failed to notify DEQ that no land application data was required. This administrative omission does not reflect on the operation of the treatment facility. The permittee completed the toxicity testing and monitoring report according to the required deadlines in the permit. The warning letter was issued because a copy of this report was not found in the DEQ file. These corrected issues do not reflect upon the performance of the treatment facility. Therefore, these warning letters have not been used as a basis for disqualifying the facility from a reduced monitoring data evaluation. Therefore, the facility data has be evaluated for reduced monitoring.

Monitoring Data Evaluation

Discharge Monitoring Report (DMR) data from January 2010 through December 2012 were reviewed and summarized in Table 2. Of the parameters monitored only pH, total suspended solids (TSS), and biochemical oxygen demand (BOD₅) can be considered for reduced monitoring. Total residual chlorine limits are not considered eligible for reduced monitoring to ensure protection of aquatic life and human health. The actual performance to permit limit ratios are summarized in the table below. Facilities with baseline monitoring that

have an actual performance to permit limit ratio of greater than 75 percent are not eligible for reduced monitoring.

Table 1 **Performance to Permit Limit Ratios (DMR Data)**

Parameter	Actual Performance/ Permit Limit Monthly Average*	Actual Performance/ Permit Limit (Maximum)*	Reduced Monitoring
pH	--	--	NA
TSS	32%, 13.6%	30%, 13.9%	1/Week
BOD ₅	4%, 1.8%	7%, 4.4%	1/Week

*The ratio based upon concentration is listed first, and the ratio based upon loading is listed second.

pH: Many of the reported values were within 0.5 Standard Units of the limit. Therefore, this facility does not qualify for a reduction in pH monitoring. The pH monitoring shall continue at 1/day.

TSS: The DMR data are consistently well below the permit limits. According to Guidance Memo 98-2005, facilities with baseline monitoring that have an actual performance to permit limit ratio of less than 25 percent are eligible for a reduced monitoring frequency of 1/week. The monitoring frequency has been reduced from 3 days/week to 1/week.

BOD₅: The DMR data are consistently below the permit limits for the 2013 reissuance. According to Guidance Memo 98-2005, facilities with baseline monitoring that have an actual performance to permit limit ratio of less than 25 percent are eligible for a reduced monitoring frequency of 1/week. The monitoring frequency has been reduced from 3 days/week to 1/week.

The permit will contain a special condition that will revert the TSS and BOD₅ monitoring frequencies back to 3 days/week if a Notice of Violation is issued for any of the parameters with reduced monitoring. The permittee is still expected to take all appropriate measures to control both the average and maximum concentrations of the pollutants of concern, regardless of any reductions in monitoring frequencies.

Table 2 Flow DMR Data for the Town of Stuart WWTP

Date DMR Due	MGD	
	Monthly Ave.	MGD Max.
10-Feb-10	0.242	0.372
10-Mar-10	0.243	0.374
10-Apr-10	0.247	0.401
10-May-10	0.24	0.377
10-Jun-10	0.233	0.397
10-Jul-10	0.239	0.352
10-Aug-10	0.241	0.356
10-Sep-10	0.251	0.328
10-Oct-10	0.222	0.333
10-Nov-10	0.203	0.335
10-Dec-10	0.217	0.346
10-Jan-11	0.174	0.388
10-Feb-11	0.19	0.22
10-Mar-11	0.187	0.292
10-Apr-11	0.253	0.437
10-May-11	0.231	0.437
10-Jun-11	0.29	0.405
10-Jul-11	0.213	0.269
10-Aug-11	0.214	0.305
10-Sep-11	0.238	0.316
10-Oct-11	0.251	0.443
10-Nov-11	0.273	0.56
10-Dec-11	0.249	0.448
10-Jan-12	0.267	0.791
10-Feb-12	0.225	0.509
10-Mar-12	0.216	0.351
10-Apr-12	0.238	0.48
10-May-12	0.23	0.463
10-Jun-12	0.252	0.885
10-Jul-12	0.235	0.743
10-Aug-12	0.233	0.366
10-Sep-12	0.217	0.409
10-Oct-12	0.272	0.722
10-Nov-12	0.247	0.344
10-Dec-12	0.222	0.453
10-Jan-13	0.239	0.69

Table 3 TSS and BOD₅ DMR Data for Town of Stuart WWTP

Due Date	TSS				BOD ₅			
	average kg/d	max kg/d	average mg/L	max mg/L	average kg/d	max kg/d	average mg/L	max mg/L
10-Feb-10	6.09	13.17	5.68	9.6	<QL	<QL	<QL	<QL
10-Mar-10	6.94	8.42	6.72	8.8	<QL	<QL	<QL	<QL
10-Apr-10	7.99	13.38	8.44	15.1	1.1	<QL	1.07	<QL
10-May-10	6.6	11.98	6.38	11.8	<QL	<QL	<QL	<QL
10-Jun-10	11.72	21.68	11.34	20.13	0.46	1.82	0.93	1.7
10-Jul-10	4.71	7.68	4.71	8.47	<QL	<QL	<QL	<QL
10-Aug-10	5.93	8.14	6.23	9.4	<QL	<QL	<QL	<QL
10-Sep-10	8.84	16.26	7.63	14	<QL	<QL	<QL	<QL
10-Oct-10	6.82	11.5	6.91	11.47	<QL	<QL	<QL	<QL
10-Nov-10	7.41	10.54	8.32	12.17	<QL	<QL	<QL	<QL
10-Dec-10	6.44	6.11	7.16	7.33	<QL	<QL	<QL	<QL
10-Jan-11	4.33	7.39	6.04	10	<QL	<QL	<QL	<QL
10-Feb-11	6.57	7.83	9.67	13	2.59	0.4	0.6	0.09
10-Mar-11	8.11	11.39	9.4	13.3	<QL	<QL	<QL	<QL
10-Apr-11	8.32	11.44	7.69	9.69	<QL	<QL	<QL	<QL
10-May-11	4.28	5.47	4.49	5.9	<QL	<QL	<QL	<QL
10-Jun-11	7.16	12.22	7.31	10	0.88	2.23	0.83	1.86
10-Jul-11	12.69	18.63	14.67	20.7	6.48	8.12	7.08	9.41
10-Aug-11	5.79	6.49	6.22	7.53	1.53	6.13	1.44	5.77
10-Sep-11	6.67	13.22	6.74	14.13	<QL	<QL	<QL	<QL
10-Oct-11	8.09	11.58	7.58	10.03	<QL	<QL	<QL	<QL
10-Nov-11	6.97	9.96	6.33	9.57	2.9	8.83	2.47	6.9
10-Dec-11	14.24	14.52	13.02	15.8	2.6	10.72	2.2	9.29
10-Jan-12	12.27	21.3	13.65	23.5	1.6	8.94	1.92	10.7
10-Feb-12	12.24	25.89	11.55	19.1	0.3	1.3	0.42	1.83
10-Mar-12	11.09	11.7	11.34	9.67	4.6	6.7	4.51	5.97
10-Apr-12	12.94	13.05	15.79	18.97	0.71	3.06	0.65	2.8
10-May-12	12.49	18.58	12.94	17.1	1.5	8.78	1.52	9.1
10-Jun-12	18.12	21.37	17.08	20.23	2.5	7.54	2.44	8
10-Jul-12	11.94	22.06	10.71	15.57	3.49	37.96	4.89	7.06
10-Aug-12	9.18	11.3	10.02	12.8	1.64	5.39	1.48	4.57
10-Sep-12	9.61	17.7	11.36	13.9	1.21	4.72	1.06	3.5
10-Oct-12	9.53	12.31	8.36	12.4	<QL	<QL	<QL	<QL
10-Nov-12	6.47	6.99	6.91	7.23	0.44	6.16	0.42	1.96
10-Dec-12	18.41	34.51	16.85	25.67	<QL	<QL	<QL	<QL
10-Jan-13	16.69	23.81	17.88	24.33	<QL	<QL	<QL	<QL
mean	9.27	13.88	9.53	13.57	1.01	3.58	1.00	2.51
maximum	18.41	34.51	17.88	25.67	6.48	37.96	7.08	10.70
minimum	4.28	5.47	4.49	5.90	<QL	<QL	<QL	<QL
permit limit	68	100	30	45	55	82	24	36
performance / permit limit) 100	13.6	13.9	32	30	1.8	4.4	4	7

Table 4 **pH DMR Data for Town of Stuart WWTP**

Date DMR Due	pH, min S.U.	H ion conc	pH, max S.U.	H ion conc
10-Feb-10	6	1.000E-06	6.59	2.570E-07
10-Mar-10	6	1.000E-06	6.59	2.570E-07
10-Apr-10	6	1.000E-06	6.68	2.089E-07
10-May-10	6.12	7.586E-07	6.85	1.413E-07
10-Jun-10	6.43	3.715E-07	6.98	1.047E-07
10-Jul-10	6.27	5.370E-07	7.02	9.550E-08
10-Aug-10	6	1.000E-06	6.81	1.549E-07
10-Sep-10	6	1.000E-06	6.91	1.230E-07
10-Oct-10	6	1.000E-06	6.84	1.445E-07
10-Nov-10	6.01	9.772E-07	6.73	1.862E-07
10-Dec-10	6	1.000E-06	8.52	3.020E-09
10-Jan-11	6	1.000E-06	6.69	2.042E-07
10-Feb-11	6	1.000E-06	7.2	6.310E-08
10-Mar-11	6	1.000E-06	6.87	1.349E-07
10-Apr-11	6.01	9.772E-07	6.7	1.995E-07
10-May-11	6.03	9.333E-07	6.7	1.995E-07
10-Jun-11	6.08	8.318E-07	6.79	1.622E-07
10-Jul-11	6.24	5.754E-07	7.19	6.457E-08
10-Aug-11	6.11	7.762E-07	6.9	1.259E-07
10-Sep-11	6	1.000E-06	6.87	1.349E-07
10-Oct-11	6.01	9.772E-07	6.97	1.072E-07
10-Nov-11	6.1	7.943E-07	6.92	1.202E-07
10-Dec-11	6.01	9.772E-07	7.28	5.248E-08
10-Jan-12	6.01	9.772E-07	6.86	1.380E-07
10-Feb-12	6	1.000E-06	6.68	2.089E-07
10-Mar-12	6	1.000E-06	6.72	1.905E-07
10-Apr-12	6.02	9.550E-07	6.8	1.585E-07
10-May-12	6.02	9.550E-07	6.54	2.884E-07
10-Jun-12	6.02	9.550E-07	6.79	1.622E-07
10-Jul-12	6.01	9.772E-07	6.74	1.820E-07
10-Aug-12	6.05	8.913E-07	6.78	1.660E-07
10-Sep-12	6.19	6.457E-07	6.68	2.089E-07
10-Oct-12	6.08	8.318E-07	6.73	1.862E-07
10-Nov-12	6.07	8.511E-07	6.79	1.622E-07
10-Dec-12	6.02	9.550E-07	6.67	2.138E-07
10-Jan-13	6.01	9.772E-07	6.4	3.981E-07

pH min. 6.00 S.U.
pH max 8.52 S.U.

Attachment I

Regional Water Quality Model

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to SOUTH MAYO RIVER.**

File Information

File Name: C:\Users\pmp94864\Documents\Working files\BECKY\PERMITS\VPDES\S
Date Modified: March 14, 2013

Water Quality Standards Information

Stream Name: SOUTH MAYO RIVER
River Basin: Roanoke River Basin
Section: 3g
Class: IV - Mountainous Zones Waters
Special Standards: none

Background Flow Information

Gauge Used: Reference Station
Gauge Drainage Area: 34.9 Sq.Mi.
Gauge 7Q10 Flow: 6.1 MGD
Headwater Drainage Area: 34.9 Sq.Mi.
Headwater 7Q10 Flow: 6.1 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 0.1747851 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 20.9 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.724605 mg/l

Model Segmentation

Number of Segments: 1
Model Start Elevation: 1160 ft above MSL
Model End Elevation: 1100 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to SOUTH MAYO RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition:	A discharge enters.
Discharge Name:	TOWN OF STUART WWTP
VPDES Permit No.:	VA0022985

Discharger Flow Information

Flow:	0.6 MGD
cBOD5:	24 mg/l
TKN:	15 mg/l
D.O.:	5.5 mg/l
Temperature:	27.4 Degrees C

Geographic Information

Segment Length:	2.7 miles
Upstream Drainage Area:	34.9 Sq.Mi.
Downstream Drainage Area:	0 Sq.Mi.
Upstream Elevation:	1160 Ft.
Downstream Elevation:	1100 Ft.

Hydraulic Information

Segment Width:	40 Ft.
Segment Depth:	0.37 Ft.
Segment Velocity:	0.701 Ft./Sec.
Segment Flow:	6.7 MGD
Incremental Flow:	-6.1 MGD (Applied at end of segment.)

Channel Information

Cross Section:	Rectangular
Character:	Mostly Straight
Pool and Riffle:	No
Bottom Type:	Silt
Sludge:	None
Plants:	None
Algae:	None

"Model Run For C:\Users\pmp94864\Documents\Working files\BECKY\PERMITS\VPDES\Stuart
 WWTp\Reissuance 2013\Data\Final Revised Stuart WWTp model output 2013 031413 1.mod
 On 3/14/2013 2:15:00 PM"

"Model is for SOUTH MAYO RIVER."

"Model starts at the TOWN OF STUART WWTp discharge."

"Background Data"

"7Q10"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.1,	2,	0,	7.725,	20.9

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.6,	24,	15,	5.5,	27.4

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.7,	40,	.37,	.701

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.7,	7.525,	9.925,	4.653,	8.502,	21.48209

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1,	1.07,	13.333,	13.81,	.35,	.392,	0,	0

"Output for Segment 1"

"Segment starts at TOWN OF STUART WWTp"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.525,	9.925,	4.653		
.1,	.1,	7.534,	9.833,	4.637		
.2,	.2,	7.543,	9.742,	4.621		
.3,	.3,	7.552,	9.652,	4.605		
.4,	.4,	7.56,	9.562,	4.589		
.5,	.5,	7.568,	9.473,	4.573		
.6,	.6,	7.576,	9.385,	4.557		
.7,	.7,	7.584,	9.298,	4.541		
.8,	.8,	7.592,	9.212,	4.525		
.9,	.9,	7.6,	9.126,	4.51		
1,	1,	7.608,	9.041,	4.495		
1.1,	1.1,	7.616,	8.957,	4.48		
1.2,	1.2,	7.624,	8.874,	4.465		
1.3,	1.3,	7.632,	8.792,	4.45		
1.4,	1.4,	7.639,	8.71,	4.435		
1.5,	1.5,	7.646,	8.629,	4.42		
1.6,	1.6,	7.652,	8.549,	4.405		
1.7,	1.7,	7.652,	8.47,	4.39		
1.8,	1.8,	7.652,	8.391,	4.375		
1.9,	1.9,	7.652,	8.313,	4.36		
2,	2,	7.652,	8.236,	4.345		
2.1,	2.1,	7.652,	8.16,	4.33		
2.2,	2.2,	7.652,	8.084,	4.315		
2.3,	2.3,	7.652,	8.009,	4.3		
2.4,	2.4,	7.652,	7.935,	4.285		
2.5,	2.5,	7.652,	7.861,	4.27		
2.6,	2.6,	7.652,	7.788,	4.255		

2.7, 2.7, 7.652, 7.716, modout.txt
4.24

"END OF FILE"

"Model Run For C:\Users\pmp94864\Documents\working files\BECKY\PERMITS\VPDES\Stuart
WWTP\Reissuance 2013\Data\Final Revised Stuart WWTP model output 2013 031413 2.mod
On 3/14/2013 2:20:18 PM"

"Model is for SOUTH MAYO RIVER."

"Model starts at the TOWN OF STUART WWTP discharge."

"Background Data"

"7Q10"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.1,	2,	0,	7.725,	20.9

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.6,	25,	15,	6.5,	27.4

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.7,	40,	.37,	.701

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.7,	7.615,	10.149,	4.653,	8.502,	21.48209

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.2,	1.285,	13.333,	13.81,	.35,	.392,	0,	0

"Output for Segment 1"

"Segment starts at TOWN OF STUART WWTP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"

0,	0,	7.615,	10.149,	4.653		
.1,	.1,	7.594,	10.036,	4.637		
.2,	.2,	7.577,	9.924,	4.621		
.3,	.3,	7.563,	9.813,	4.605		
.4,	.4,	7.552,	9.704,	4.589		
.5,	.5,	7.543,	9.596,	4.573		
.6,	.6,	7.536,	9.489,	4.557		
.7,	.7,	7.531,	9.383,	4.541		
.8,	.8,	7.528,	9.279,	4.525		
.9,	.9,	7.527,	9.176,	4.51		
1,	1,	7.527,	9.074,	4.495		
1.1,	1.1,	7.528,	8.973,	4.48		
1.2,	1.2,	7.53,	8.873,	4.465		
1.3,	1.3,	7.533,	8.774,	4.45		
1.4,	1.4,	7.537,	8.676,	4.435		
1.5,	1.5,	7.541,	8.579,	4.42		
1.6,	1.6,	7.546,	8.483,	4.405		
1.7,	1.7,	7.551,	8.389,	4.39		
1.8,	1.8,	7.557,	8.296,	4.375		
1.9,	1.9,	7.563,	8.204,	4.36		
2,	2,	7.569,	8.113,	4.345		
2.1,	2.1,	7.576,	8.023,	4.33		
2.2,	2.2,	7.583,	7.934,	4.315		
2.3,	2.3,	7.59,	7.846,	4.3		
2.4,	2.4,	7.597,	7.759,	4.285		
2.5,	2.5,	7.604,	7.673,	4.27		
2.6,	2.6,	7.612,	7.588,	4.255		

2.7,	2.7,	7.62,	7.504,	modout.txt
				4.24

"END OF FILE"

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WWTP\Reissuance 2013\Data\Final Revised Stuart WWTP model output 2013 031413 2.mod
On 3/14/2013 2:20:18 PM"

"Model is for SOUTH MAYO RIVER."

"Model starts at the TOWN OF STUART WWTP discharge."

"Background Data"

"7Q10"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.1,	2,	0,	7.725,	20.9

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"CBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.6,	25,	15,	6.5,	27.4

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.7,	40,	.37,	.701

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"CBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.7,	7.615,	10.149,	4.653,	8.502,	21.48209

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.2,	1.285,	13.333,	13.81,	.35,	.392,	0,	0

"Output for Segment 1"

"Segment starts at TOWN OF STUART WWTP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"CBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	7.615,	10.149,	4.653		
.1,	.1,	7.594,	10.036,	4.637		
.2,	.2,	7.577,	9.924,	4.621		
.3,	.3,	7.563,	9.813,	4.605		
.4,	.4,	7.552,	9.704,	4.589		
.5,	.5,	7.543,	9.596,	4.573		
.6,	.6,	7.536,	9.489,	4.557		
.7,	.7,	7.531,	9.383,	4.541		
.8,	.8,	7.528,	9.279,	4.525		
.9,	.9,	7.527,	9.176,	4.51		
1,	1,	7.527,	9.074,	4.495		
1.1,	1.1,	7.528,	8.973,	4.48		
1.2,	1.2,	7.53,	8.873,	4.465		
1.3,	1.3,	7.533,	8.774,	4.45		
1.4,	1.4,	7.537,	8.676,	4.435		
1.5,	1.5,	7.541,	8.579,	4.42		
1.6,	1.6,	7.546,	8.483,	4.405		
1.7,	1.7,	7.551,	8.389,	4.39		
1.8,	1.8,	7.557,	8.296,	4.375		
1.9,	1.9,	7.563,	8.204,	4.36		
2,	2,	7.569,	8.113,	4.345		
2.1,	2.1,	7.576,	8.023,	4.33		
2.2,	2.2,	7.583,	7.934,	4.315		
2.3,	2.3,	7.59,	7.846,	4.3		
2.4,	2.4,	7.597,	7.759,	4.285		
2.5,	2.5,	7.604,	7.673,	4.27		
2.6,	2.6,	7.612,	7.588,	4.255		

2.7, 2.7, 7.62, 7.504, modout.txt
4.24

"END OF FILE"

modout.txt

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WWTP\Reissuance 2013\Data\Final Revised Stuart WWTP model output 2013 031413 2.mod
on 3/14/2013 2:22:46 PM"

"Model is for SOUTH MAYO RIVER."

"Model starts at the TOWN OF STUART WWTP discharge."

"Background Data"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.1,	2,	0,	7.725,	20.9

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.6,	18,	15,	5.4,	27.4

violates antidegradation

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.7,	40,	.37,	.701

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.7,	7.516,	8.582,	4.653,	8.502,	21.48209

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1,	1.07,	13.333,	13.81,	.35,	.392,	0,	0

"Output for Segment 1"

"Segment starts at TOWN OF STUART WWTP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"

0,	0,	7.516,	8.582,	4.653		
.1,	.1,	7.538,	8.502,	4.637		
.2,	.2,	7.558,	8.423,	4.621		
.3,	.3,	7.577,	8.345,	4.605		
.4,	.4,	7.594,	8.267,	4.589		
.5,	.5,	7.61,	8.19,	4.573		
.6,	.6,	7.625,	8.114,	4.557		
.7,	.7,	7.639,	8.039,	4.541		
.8,	.8,	7.652,	7.964,	4.525		
.9,	.9,	7.652,	7.89,	4.51		
1,	1,	7.652,	7.817,	4.495		
1.1,	1.1,	7.652,	7.744,	4.48		
1.2,	1.2,	7.652,	7.672,	4.465		
1.3,	1.3,	7.652,	7.601,	4.45		
1.4,	1.4,	7.652,	7.53,	4.435		
1.5,	1.5,	7.652,	7.46,	4.42		
1.6,	1.6,	7.652,	7.391,	4.405		
1.7,	1.7,	7.652,	7.322,	4.39		
1.8,	1.8,	7.652,	7.254,	4.375		
1.9,	1.9,	7.652,	7.187,	4.36		
2,	2,	7.652,	7.12,	4.345		
2.1,	2.1,	7.652,	7.054,	4.33		
2.2,	2.2,	7.652,	6.988,	4.315		
2.3,	2.3,	7.652,	6.923,	4.3		
2.4,	2.4,	7.652,	6.859,	4.285		
2.5,	2.5,	7.652,	6.795,	4.27		
2.6,	2.6,	7.652,	6.732,	4.255		

2.7, 2.7, 7.652, 6.669, modout.txt
4.24

"END OF FILE"

modout.txt

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WWTP\Reissuance 2013\Data\Final Revised Stuart WWTP model output 2013 031413 2.mod
On 3/14/2013 2:23:44 PM"

"Model is for SOUTH MAYO RIVER."

"Model starts at the TOWN OF STUART WWTP discharge."

"Background Data"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.1,	2,	0,	7.725,	20.9

"Discharge/Tributary Input Data for Segment 1"

"Flow"	"cBOD5"	"TKN"	"DO"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
.6,	25,	15,	5.9,	27.4

violates antidegradation

"Hydraulic Information for Segment 1"

"Length"	"width"	"Depth"	"Velocity"
"(mi)"	"(ft)"	"(ft)"	"(ft/sec)"
2.7,	40,	.37,	.701

"Initial Mix Values for Segment 1"

"Flow"	"DO"	"cBOD"	"nBOD"	"DOSat"	"Temp"
"(mgd)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"(mg/l)"	"deg C"
6.7,	7.561,	10.149,	4.653,	8.502,	21.48209

"Rate Constants for Segment 1. - (All units Per Day)"

"k1"	"k1@T"	"k2"	"k2@T"	"kn"	"kn@T"	"BD"	"BD@T"
1.2,	1.285,	13.333,	13.81,	.35,	.392,	0,	0

"Output for Segment 1"

"Segment starts at TOWN OF STUART WWTP"

"Total"	"Segm."	"Dist."	"Dist."	"DO"	"cBOD"	"nBOD"
"(mi)"	"(mi)"	"(mi)"	"(mi)"	"(mg/l)"	"(mg/l)"	"(mg/l)"
0,	0,	0,	0,	7.561,	10.149,	4.653
.1,	.1,	.1,	.1,	7.546,	10.036,	4.637
.2,	.2,	.2,	.2,	7.534,	9.924,	4.621
.3,	.3,	.3,	.3,	7.525,	9.813,	4.605
.4,	.4,	.4,	.4,	7.518,	9.704,	4.589
.5,	.5,	.5,	.5,	7.513,	9.596,	4.573
.6,	.6,	.6,	.6,	7.51,	9.489,	4.557
.7,	.7,	.7,	.7,	7.508,	9.383,	4.541
.8,	.8,	.8,	.8,	7.508,	9.279,	4.525
.9,	.9,	.9,	.9,	7.509,	9.176,	4.51
1,	1,	1,	1,	7.511,	9.074,	4.495
1.1,	1.1,	1.1,	1.1,	7.514,	8.973,	4.48
1.2,	1.2,	1.2,	1.2,	7.518,	8.873,	4.465
1.3,	1.3,	1.3,	1.3,	7.522,	8.774,	4.45
1.4,	1.4,	1.4,	1.4,	7.527,	8.676,	4.435
1.5,	1.5,	1.5,	1.5,	7.532,	8.579,	4.42
1.6,	1.6,	1.6,	1.6,	7.538,	8.483,	4.405
1.7,	1.7,	1.7,	1.7,	7.544,	8.389,	4.39
1.8,	1.8,	1.8,	1.8,	7.551,	8.296,	4.375
1.9,	1.9,	1.9,	1.9,	7.558,	8.204,	4.36
2,	2,	2,	2,	7.565,	8.113,	4.345
2.1,	2.1,	2.1,	2.1,	7.572,	8.023,	4.33
2.2,	2.2,	2.2,	2.2,	7.579,	7.934,	4.315
2.3,	2.3,	2.3,	2.3,	7.587,	7.846,	4.3
2.4,	2.4,	2.4,	2.4,	7.595,	7.759,	4.285
2.5,	2.5,	2.5,	2.5,	7.603,	7.673,	4.27
2.6,	2.6,	2.6,	2.6,	7.611,	7.588,	4.255

2.7, 2.7, 7.619, 7.504, modout.txt
4.24

"END OF FILE"

Attachment J

Biosolids Data

Stuart WWTP
VA0022985

Field S01 Sludge Monitoring (mg/kg)

	As		Cd		Cu		Pb		Hg		Mb		Ni		Se		Zn	
Due Date	Average	Max	Average	Max	Average	Max	Max	Average	Max	Average	Max	Average	Max	Average	Max	Average	Max	Average
Permit Limits	41	75	39	85	1500	4300	840	300	57	17	75	NA	420	420	100	100	7500	2800
2004	1.25	1.43	2	2.3	455	496	59	51	1.81	1.73	25		33	25.5	3.42	3.35	961	868.5
2005	1.10	1.10	1.95	2.0	519	555	<18	<11.5	2.41		16		23	21.5	5.89	4.98	907	894.5
2006	1.35	1.5	3.0	3.0	634	668	91	45	3.0	2.95	7		26	22.5	4.6	3.9	1200	1175
2007	2.9	2.9	1.0	2.0	690	817	59	48	3.5	2.6	6.0		25	23.0	5.4	5.4	1290	1220
2008	1.7	1.7	1.6	1.6	460	460	31	31	1.7	1.7	5		17	17	3.0	3.0	846	846
2009	<1.0	<1.0	2.0	2.0	674	674	44	44	2.0	2.0	7		21	21	5.9	5.9	9.9	9.9
2010	2.0	2.0	1.0	1.0	489	489	35	35	1.7	1.7	<5.0		20	20	1.0	1.0	726	726



1901 Innovation Drive, Suite 2100 • Blacksburg, VA 24060
 Main: (540)552-8548 • www.chacompanies.com

**VPDES Permit Application
 Land Application Site Map
 Town of Stuart Wastewater Treatment Plant
 Figure 1**



Project No. 24794	
Date : February 2013	
0	600 Ft



CHIA

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Main: (540)552-5548 • www.chacompanies.com

VPDES Permit Application
Land Application Site Soil Survey Map
Town of Stuart Wastewater Treatment Plant
Figure 2



Project No.
24794

Date : February 2013

0 600
Ft

Attachment K

Toxics Management Program Justification Memorandum

M E M O R A N D U M
DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Toxics Management Plan Justification for Town of Stuart WWTP
 VPDES Permit No. VA0022985

TO: Permit File

FROM: Becky L. France, Water Permit Writer *BLF*

DATE: February 28, 2013

DISCUSSION:

Attached are the results of the previous data reviews that cover all of the available data for outfall 001. Acute and chronic tests were performed using *Pimephales promelas* for the acute test and *Ceriodaphnia dubia* for the chronic test. The facility has not failed either an acute or chronic toxicity test since the permit reissuance.

RECOMMENDATIONS:

The toxicity testing acute and chronic wasteload allocations and NOEC endpoint calculations are included on the attached spreadsheet. The acute and chronic wasteload allocations and test results were entered into the STATS program to determine if a limit is needed. The output from this program indicated that a limit is not needed. In accordance with Guidance Memo 00-2012, annual whole effluent toxicity testing will continue for the Town of Stuart WWTP.

Guidance Memo 00-2012 designates criteria to allow testing of only one species per test type rather than two species. The criteria designate one of two conditions that need to be met: (1) the average percent survival in 100% effluent for all the acceptable acute tests during a permit term with a particular species is ≥ 100 , or (2) the average percent survival in 100% effluent for all of the acceptable chronic tests during a permit term with a particular species is $\geq 80\%$ and the secondary endpoint for reproduction or growth is an NOEC=100%. If the criteria indicate that there is no possibility for toxicity from tests with the evaluated species, annual testing with the other tested species should be sufficient. A summary of the acute and chronic toxicity testing data is found in Tables 2 and 3. Based upon these test results, both *Ceriodaphnia dubia* and *Pimephales promelas* meet the first criteria for acute toxicity testing. For chronic toxicity testing, *C. dubia* meet the second criteria. Therefore, acute and chronic toxicity tests shall be required using *P. promelas*.

Table 1 **FACILITY INFORMATION**

FACILITY: Town of Stuart WWTP
LOCATION: Stuart, Virginia
VPDES PERMIT NUMBER: VA0022985 **Expiration Date:** 7/5/2013
SIC CODE/DESCRIPTION: 4952/Sewerage Systems
DESIGN FLOW: **Outfall 001 =** 0.60 MGD

RECEIVING STREAM/CRITICAL FLOWS/IWC:

Receiving Stream:	South Mayo River		
River Basin:	Roanoke River		
River Subbasin:	Roanoke River		
Section:	3g		
Class:	IV		
Special Standards:	None		
1Q10 =	5.5 MGD	30Q5 =	9.5 MGD
7Q10 =	6.1 MGD	Harmonic mean =	21 MGD

WASTEWATER AND TREATMENT:

This plant operates under the conventional activated sludge treatment process, which consists of screening, activated sludge aeration, secondary clarification, chlorine disinfection, dechlorination, sludge digestion and thickening. The wastewater treatment process consists of the following in order of treatment:

Biological Treatment Using Extended Mode of Activated Sludge Process

Screening (mechanical bar screen and aerated grit collector)

Aeration

Secondary Clarification

Chlorination

Dechlorination

Final Effluent Flow Metering (Parshall Flume)

Solids Handling

Return Sludge to Aeration Basins

Thickener

Aerobic Sludge Digester

Dewatering

PROPOSED TMP REQUIREMENTS:

Annual acute and chronic toxicity tests for the duration of the permit. The acute tests shall be 48-hour static tests using *P. promelas*. The chronic tests shall be 3-brood survival and growth tests using *P. promelas*.

Table 2
 Acute TMP Test Data
 Town of Stuart WWTP
 VPDES Permit No. VA0022985

Test Dates	Test Organism	LC ₅₀	% Survival in 100% Effluent	Testing Lab
9/2008 (1 st Annual)	<i>P. promelas</i>	>100	100	Olver Inc.
12/2008 (1 st Annual)	<i>C. dubia</i>	>100	100	Olver Inc.
9/2010 (2 nd Annual)	<i>C. dubia</i>	>100	100	CBI Inc.
	<i>P. promelas</i>	>100	100	CBI Inc.
9/2011 (3 rd Annual)	<i>C. dubia</i>	>100	100	CBI Inc.
	<i>P. promelas</i>	>100	100	CBI Inc.
9/2012 (4 th Annual)	<i>C. dubia</i>	>100	100	CBI Inc.
	<i>P. promelas</i>	>100	100	CBI Inc.

Table 3
 Chronic TMP Test Data
 Town of Stuart WWTP
 VPDES Permit No. VA0022985

Test Dates	Test Organism	% NOEC Survival	% NOEC Reproduction	% Survival in 100% Effluent	Testing Lab
9/2008 (1 st Annual)	<i>C. dubia</i>	100	100	90	Olver, Inc.
12/2008 (1 st Annual)	<i>P. promelas</i>	100	100	97.5	Olver Inc.
9/2010 (2 nd Annual)	<i>C. dubia</i>	100	100	100	CBI Inc.
	<i>P. promelas</i>	100	41.2 (TU _c =2.4)	100	CBI Inc.
9/2011 (3 rd Annual)	<i>C. dubia</i>	100	100	100	CBI Inc.
	<i>P. promelas</i>	100	100	98	CBI Inc.
9/2012 (4 th Annual)	<i>C. dubia</i>	100	100	90	CBI Inc.
	<i>P. promelas</i>	100	100	100	CBI Inc.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	
2	Spreadsheet for determination of WET test endpoints or WET limits															
4	Excel 97			Acute Endpoint/Permit Limit			Use as LC₅₀ in Special Condition, as TU_a on DMR									
5	Revision Date: 01/10/05															
6	File: WETLIM10.xls			ACUTE	1.6332084	TU _a	LC ₅₀ =	62	% Use as	1.61	TU _a					
7	(MIX.EXE required also)															
8				ACUTE WLA _a	2.058075	Note: Inform the permittee that if the mean of the data exceeds this TU _a :										
9							1.0	a limit may result using WLA.EXE								
10																
11				Chronic Endpoint/Permit Limit			Use as NOEC in Special Condition, as TU_c on DMR									
12																
13				CHRONIC	16.332084	TU _c	NOEC =	7	% Use as	14.28	TU _c					
14				BOTH*	20.5807505	TU _c	NOEC =	5	% Use as	20.00	TU _c					
15	Enter data in the cells with blue type:			AML	16.332084	TU _c	NOEC =	7	% Use as	14.28	TU _c					
16																
17	Entry Date: 01/24/13			ACUTE WLA _{a,c}	20.58075	Note: Inform the permittee that if the mean										
18	Facility Name: Town of Stuart WWTP			CHRONIC WLA _c	11.1666667	of the data exceeds this TU _c :										
19	VPDES Number: VA0022985			* Both means acute expressed as chronic			a limit may result using WLA.EXE									
20	Outfall Number: 1															
21				% Flow to be used from MIX.EXE			Difuser /modeling study?									
22	Plant Flow: 0.6 MGD						Enter Y/N N									
23	Acute 1Q10: 5.5 MGD			63.93	%	Acute :1										
24	Chronic 7Q10: 6.1 MGD			100	%	Chronic :1										
25																
26	Are data available to calculate CV? (Y/N)			N	(Minimum of 10 data points, same species, needed)						Go to Page 2					
27	Are data available to calculate ACR? (Y/N)			N	(NOEC<LC50, do not use greater/less than data)						Go to Page 3					
28																
29																
30	IWC _a			14.57672825	%	Plant flow/plant flow + 1Q10	NOTE: If the IWC _a is >33%, specify the									
31	IWC _c			8.955223881	%	Plant flow/plant flow + 7Q10	NOAEC = 100% test/endpoint for use									
32																
33	Dilution, acute			6.86025	100/IWC _a											
34	Dilution, chronic			11.16666667	100/IWC _c											
35																
36	WLA _a			2.058075	Instream criterion (0.3 TU _a) X's Dilution, acute											
37	WLA _c			11.16666667	Instream criterion (1.0 TU _c) X's Dilution, chronic											
38	WLA _{a,c}			20.58075	ACR X's WLA _a - converts acute WLA to chronic units											
39																
40	ACR -acute/chronic ratio			10	LC50/NOEC (Default is 10 - if data are available, use tables Page 3)											
41	CV-Coefficient of variation			0.6	Default of 0.6 - if data are available, use tables Page 2)											
42	Constants eA			0.4109447	Default = 0.41											
43	eB			0.6010373	Default = 0.60											
44	eC			2.4334175	Default = 2.43											
45	eD			2.4334175	Default = 2.43 (1 samp)											
46							No. of sample	1	**The Maximum Daily Limit is calculated from the lowest LTA, X's eC. The LTA _{a,c} and MDL using it are driven by the ACR.							
47	LTA _{a,c}			8.457550135	WLA _{a,c} X's eA											
48	LTA _c			6.711583183	WLA _c X's eB											
49	MDL** with LTA _{a,c}			20.5807505	TU _c	NOEC =	4.858909	(Protects from acute/chronic toxicity)			NOEC =	5	%			
50	MDL** with LTA _c			16.33208397	TU _c	NOEC =	6.122917	(Protects from chronic toxicity)			NOEC =	7	%			
51	AML with lowest LTA			16.33208397	TU _c	NOEC =	6.122917	Lowest LTA X's eD			NOEC =	7	%			
52																
53	IF ONLY ACUTE ENDPOINT/LIMIT IS NEEDED, CONVERT MDL FROM TU _c to TU _a															
54																
55	MDL with LTA _{a,c}			2.05807505	TU _a	LC50 =	48.589093	%	Rounded LC50's			LC50 =	49	%		
56	MDL with LTA _c			1.633208397	TU _a	LC50 =	61.229173	%				LC50 =	62	%		
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Cell: I9

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: K18

Comment:

This is assuming that the data are Type 2 data (none of the data in the data set are censored - "<" or ">").

Cell: J22

Comment:

Remember to change the "N" to "Y" if you have ratios entered, otherwise, they won't be used in the calculations.

Cell: C40

Comment:

If you have entered data to calculate an ACR on page 3, and this is still defaulted to "10", make sure you have selected "Y" in cell E21

Cell: C41

Comment:

If you have entered data to calculate an effluent specific CV on page 2, and this is still defaulted to "0.6", make sure you have selected "Y" in cell E20

Cell: L48

Comment:

See Row 151 for the appropriate dilution series to use for these NOEC's

Cell: G82

Comment:

Vertebrates are:

Pimephales promelas

Oncorhynchus mykiss

Cyprinodon variegatus

Cell: J62

Comment:

Invertebrates are:

Ceriodaphnia dubia

Mysidopsis bahia

Cell: C117

Comment:

Vertebrates are:

Pimephales promelas

Cyprinodon variegatus

Cell: M119

Comment:

The ACR has been picked up from cell C34 on Page 1. If you have paired data to calculate an ACR, enter it in the tables to the left, and make sure you have a "Y" in cell E21 on Page 1. Otherwise, the default of 10 will be used to convert your acute data.

Cell: M121

Comment:

If you are only concerned with acute data, you can enter it in the NOEC column for conversion and the number calculated will be equivalent to the TUA. The calculation is the same: $100/\text{NOEC} = \text{TUc}$ or $100/\text{LC50} = \text{TUA}$.

Cell: C138

Comment:

Invertebrates are:

Ceriodaphnia dubia

Mysidopsis bahia

1/24/2013 3:26:03 PM

Facility = Town of Stuart WWTP
Chemical = Whole Effluent Toxicity (T.U.)
Chronic averaging period = 4
WLAa = 21
WLAc = 11
Q.L. = 1
samples/mo. = 1
samples/wk. = 1

Summary of Statistics:

observations = 8
Expected Value = 1.175
Variance = .497025
C.V. = 0.6
97th percentile daily values = 2.85926
97th percentile 4 day average = 1.95495
97th percentile 30 day average = 1.41711
< Q.L. = 0
Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are: (chronic)

1
1
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2.4
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Attachment L

Public Notice, Public Comments, Response to Comments

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Patrick County, Virginia

PUBLIC COMMENT PERIOD: 30 days following the public notice issue date; comment period ends 4:30 pm of last day

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS, AND PERMIT NUMBER: Town of Stuart, PO Box 422, Stuart, Virginia 24171, VA0022985

FACILITY NAME AND LOCATION: Town of Stuart WWTP, 709 Commerce Street, Stuart, Virginia 24171

PROJECT DESCRIPTION: The Town of Stuart has applied for a reissuance of a permit for the wastewater treatment plant in Patrick County. The applicant proposes to release treated sewage wastewater at a rate of 60,000 gallons per day from the current facility into a water body. A sludge management plan has been submitted proposing to haul sludge to a landfill. Alternatively, the permittee proposes application of approximately 37.5 dry metric tons of sludge per year to agricultural lands. Sludge application will be made at or below standard agronomic rates. The sludge management plan identifies a site on approximately 65.6 acres identified as the KP Hill Dairy Inc. This site is owned by the Mr. Wayne M. Kirkpatrick. The facility proposes to release the treated sewage to into the South Mayo River in Patrick County in the Upper South Mayo/River/Russell Creek Watershed (VAW-L43R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: nutrients, organic matter, solids, toxic pollutants, dissolved oxygen (minimum)

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for a public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if a public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION:

Becky L. France; ADDRESS: Virginia Department of Environmental Quality, Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; (540) 562-6700; E-MAIL ADDRESS: becky.france@deq.virginia.gov; FAX: (540) 562-6725. The public may review the draft permit and application at the DEQ office named above (by appointment) or may request copies of the documents from the contact person listed above.

France, Becky (DEQ)

From: France, Becky (DEQ)
Sent: Tuesday, June 18, 2013 10:24 AM
To: 'Byrne, Margaret'
Subject: FW: Signed Letter to DEQ Re: Town of Stuart WWTP VA0022985

Thank you for your comments. I have reviewed your request to extend the buffer zones for the Town of Stuart WWTP permit. Please see response from our DEQ Central Office. In accordance with Agency guidance, there are no other site specific conditions on the land application sites, so there will be no changes to the buffer zones for the land application sites.

From: Foster, Kip (DEQ)
Sent: Thursday, June 13, 2013 7:57 AM
To: France, Becky (DEQ)
Subject: FW: Signed Letter to DEQ Re: Town of Stuart WWTP VA0022985

From: Zahradka, Neil (DEQ)
Sent: Tuesday, June 11, 2013 1:34 PM
To: Foster, Kip (DEQ)
Cc: Thomas, Bryant (DEQ); Wood, Christina (DEQ); Cunningham, Frederick (DEQ); DiLella, Fred (DEQ)
Subject: RE: Signed Letter to DEQ Re: Town of Stuart WWTP VA0022985

Kip,
Guidance on the subject can be found at
http://townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\GuidanceDocs\440\GDoc_DEQ_4389_v1.pdf.

Note in particular page 8:

Biosolids permits are established as permitting no discharge to surface waters, and existing buffer requirements are established to maintain that condition. Land application buffers to surface waters need not be extended unless there is an accompanying site-specific condition that would increase the risk of discharge to surface waters (e.g. slope).

In other words – if there were no other factors which would cause staff to extend a setback to avoid a discharge the river, then the setback should not be extended just because of the endangered species concern.

Neil

From: France, Becky (DEQ)
Sent: Tuesday, June 11, 2013 10:58 AM
To: Foster, Kip (DEQ)
Subject: FW: Signed Letter to DEQ Re: Town of Stuart WWTP VA0022985

Here is a copy of the public comments from the Fish and Wildlife Service regarding the vegetative buffer to a stream located at the biosolids land application site for the Town of Stuart WWTP. I am wondering if these buffer zone concerns in regard to endangered species have been addressed in other permits.

The permit application (found on u:\wpermits\permits in draft\)) shows the Mayo River along some of the field boundaries. The application also indicates that sludge will not be incorporated to any portion of the site if applied to areas subject to flooding at a 25 year or less frequency. The application notes that sludge will be kept a minimum of 50 feet from all surface water courses unless incorporated. The draft permit currently has the following special condition:

7. Buffer Zones

Land application of biosolids shall not occur within the following minimum buffer zones:

Adjacent Features	Minimum Distance (feet) to Land Application Area		
	Surface Application ⁽¹⁾	Incorporation	Winter ⁽²⁾
Occupied dwellings *	200	200	200
Water supply wells and springs	100	100	100
Property lines *	100	50	100
Adjacent Features	Minimum Distance (feet) to Land Application Area		
	Surface Application ⁽¹⁾	Incorporation	Winter ⁽²⁾
Occupied buildings on publicly accessible sites ³	400	400	400
Property lines of publicly accessible sites ³	200	200	200
Perennial streams and other surface waters except intermittent streams	50	35	100
Intermittent streams/drainage ditches	25	25	50
All improved roadways	10	5	10
Rock outcrops and sinkholes	25	25	25
Agricultural drainage ditches with slopes equal to or less than 2.0%	10	5	10

- (1) Not plowed or disked to incorporate within 48 hours.
- (2) If surface application occurs on average site slope greater than 7% during the time between November 16 of one year and March 15 of the following year
- (3) Publicly accessible sites are open to the general public and routinely accommodate pedestrians and include, but are not limited to, schools, churches, hospitals, parks, nature trails, businesses and sidewalks. Temporary structures, public roads or similar thoroughfares are not considered publicly accessible.

From: Byrne, Margaret [mailto:margaret_byrne@fws.gov]

Sent: Friday, June 07, 2013 2:44 PM

To: France, Becky (DEQ)

Cc: Roberta Hylton; smith.mark@epa.gov; Ewing, Amy (DGIF); Pinder, Mike (DGIF); Hypes, Rene (DCR); Susan Lingenfelter; Brett Hillman

Subject: Signed Letter to DEQ Re: Town of Stuart WWTP VA0022985

Hi Becky,

Attached please find the Service's comments the Town of Stuart WWTP.
I believe you will also receive a paper copy of these comments in the mail.

Best,

Margaret Byrne

--

Margaret Byrne, MS, MPPA

Environmental Contaminants Information Specialist

U.S. Fish and Wildlife Service, Northeast Region

300 Westgate Center Dr., Hadley, MA 01035

Office: 413-253-8593

Cell: 612-599-4252



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
6669 Short Lane
Gloucester, Virginia 23061



JUN 07 2013

Ms. Becky France
Virginia Department of Environmental Quality
Blue Ridge Regional Office
3019 Peters Creek Road
Roanoke, Virginia 24019

Re: Town of Stuart WWTP, Permit
VA0022985 Re-issuance, Patrick
County, Virginia, Project # 2012-
EC-0079

Dear Ms. France:

The U.S. Fish and Wildlife Service (Service) has reviewed the March 8, 2013 information provided by the Virginia Department of Environmental Quality (VDEQ) regarding the referenced project. The draft permit proposes re-issuance of the Town of Stuart waste water treatment plant wastewater treatment plant's (WWTP) discharge of 600,000 gallons per day wastewater and allows the WWTP to apply biosolids to nearby agricultural fields. The following comments are provided under provisions of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended.

Based on the project description and location, it appears that no impacts to federally listed species or designated critical habitat will occur due to the discharge of the WWTP's effluent discharge, and we have no further comment. The Service, does however, have comments that pertain to biosolids application. The agricultural fields permitted for biosolids application are adjacent to the South Mayo River. Based on the description and location of these agricultural fields, the federally listed endangered James spinymussel (*Pleurobema collina*) is present downstream in the South Mayo River. This location also provides habitat for the federally listed endangered Roanoke logperch (*Percina rex*). The Service is concerned with the proximity of biosolids application to the bank of the South Mayo River because runoff may negatively impact these two species.

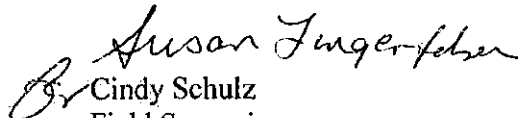
Under the heading *Biosolids Special Conditions: Field Operations*, the draft permit states "Sewage Sludge shall not be applied to the land if it is likely to adversely affect a threatened or endangered species listed in the Water Quality Standards Regulation (9 VAC25-260-320) or § 4 of the Endangered Species Act (16 USC § 1533) or if the land application is likely to adversely

affect its designated critical habitat" (VDEQ 2013). This sewage sludge is permitted to contain arsenic, cadmium, copper, lead, mercury, nickel, selenium, and zinc. Runoff from this application of biosolids may negatively impact the James spinymussel and Roanoke logperch because listed species such as these are often more sensitive to contaminants and water quality issues (Dwyer et al. 2005).

The Service requests that the permittee's Nutrient Management Plan (or other official documentation) be modified to require a protective 100-foot vegetated buffer between the site of biosolids application and the bank of the South Mayo River. To ensure a protective barrier exists between the biosolids and the South Mayo River this buffer should not be mowed or plowed. If the permittee is not able to leave a buffer or otherwise ensure that the land application of biosolids is protective of listed species, further consultation with the Service will be necessary.

Species information and other information regarding project reviews within Virginia are available at http://www.fws.gov/northeast/virginiafield/endspecies/project_reviews.html. If you have any questions, please contact Margaret Byrne of this office at (413) 253-8593, or via email at margaret_byrne@fws.gov.

Sincerely,


Cindy Schulz
Field Supervisor
Virginia Ecological Services

cc: EPA, Philadelphia, PA (Attn: Mark Smith)
Service, Abingdon, VA (Attn: Roberta Hylton)
VDGIF, Richmond, VA (Attn: Amy Ewing, Mike Pinder)
VDCR, Richmond, VA (Attn: Rene Hypes)

Literature Cited

- Dwyer, F.J., D.K. Hardesty, C.E. Henke, C.G. Ingersoll, D.W. Whites, T. Augspurger, T.J. Canfield, D.R. Mount, and F.L. Mayer. 2005. Assessing contaminant sensitivity of endangered and threatened aquatic species: Part III. Effluent toxicity tests. *Archives of Environmental Contamination and Toxicology* 48:174–183.
- Virginia Department of Environmental Quality (DEQ). 2013. Town of Stuart WWTP Draft Permit VA0022985. Roanoke, VA. 29 p. plus appendices.

Attachment M

EPA Checksheet

Revised 2/2003

**State "FY2003 Transmittal Checklist" to Assist in Targeting
Municipal and Industrial Individual NPDES Draft Permits for Review**

Part I. State Draft Permit Submission Checklist

In accordance with the MOA established between the Commonwealth of Virginia and the United States Environmental Protection Agency, Region III, the Commonwealth submits the following draft National Pollutant Discharge Elimination System (NPDES) permit for Agency review and concurrence.

Facility Name: Town of Stuart WWTP

NPDES Permit Number: VA0022985

Permit Writer Name: Becky L. France

Date: 11/29/13

Major ☐

Minor ☒

Industrial ☐

Municipal ☒

I.A. Draft Permit Package Submittal Includes:

	Yes	No	N/A
1. Permit Application?	X		
2. Complete Draft Permit (for renewal or first time permit – entire permit, including boilerplate information)?	X		
3. Copy of Public Notice?	X		
4. Complete Fact Sheet?	X		
5. A Priority Pollutant Screening to determine parameters of concern?	X		
6. A Reasonable Potential analysis showing calculated WQBELs?	X		
7. Dissolved Oxygen calculations?	X		
8. Whole Effluent Toxicity Test summary and analysis?	X		
9. Permit Rating Sheet for new or modified industrial facilities?			X

I.B. Permit/Facility Characteristics

	Yes	No	N/A
1. Is this a new, or currently unpermitted facility?		X	
2. Are all permissible outfalls (including combined sewer overflow points, non-process water and storm water) from the facility properly identified and authorized in the permit?	X		
3. Does the fact sheet or permit contain a description of the wastewater treatment process?	X		

I.B. Permit/Facility Characteristics – cont. (FY2003)	Yes	No	N/A
4. Does the review of PCS/DMR data for at least the last 3 years indicate significant non-compliance with the existing permit?		X	
5. Has there been any change in streamflow characteristics since the last permit was developed?	X		
6. Does the permit allow the discharge of new or increased loadings of any pollutants?		X	
7. Does the fact sheet or permit provide a description of the receiving water body(s) to which the facility discharges, including information on low/critical flow conditions and designated/existing uses?	X		
8. Does the facility discharge to a 303(d) listed water?		X	
a. Has a TMDL been developed and approved by EPA for the impaired water?			X
b. Does the record indicate that the TMDL development is on the State priority list and will most likely be developed within the life of the permit?			X
c. Does the facility discharge a pollutant of concern identified in the TMDL or 303(d) listed water?			X
9. Have any limits been removed, or are any limits less stringent, than those in the current permit?		X	
10. Does the permit authorize discharges of storm water? No exposure exemption granted			X
11. Has the facility substantially enlarged or altered its operation or substantially increased its flow or production?		X	
12. Are there any production-based, technology-based effluent limits in the permit?		X	
13. Do any water quality-based effluent limit calculations differ from the State's standard policies or procedures?		X	
14. Are any WQBELs based on an interpretation of narrative criteria?		X	
15. Does the permit incorporate any variances or other exceptions to the State's standards or regulations?		X	
16. Does the permit contain a compliance schedule for any limit or condition?		X	
17. Is there a <u>potential</u> impact to endangered/threatened species or their habitat by the facility's discharge(s)?	X		
18. Have impacts from the discharge(s) at downstream potable water supplies been evaluated?			X
19. Is there any indication that there is significant public interest in the permit action proposed for this facility?		X	
20. Have previous permit, application, and fact sheet been examined?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Checklist – for POTWs (To be completed and included in the record only for POTWs)

II.A. Permit Cover Page/Administration

	Yes	No	N/A
1. Does the fact sheet or permit describe the physical location of the facility, including latitude and longitude (not necessarily on permit cover page)?	X		
2. Does the permit contain specific authorization-to-discharge information (from where to where, by whom)?	X		

II.B. Effluent Limits – General Elements

	Yes	No	N/A
1. Does the fact sheet describe the basis of final limits in the permit (e.g., that a comparison of technology and water quality-based limits was performed, and the most stringent limit selected)?	X		
2. Does the fact sheet discuss whether "antibacksliding" provisions were met for any limits that are less stringent than those in the previous NPDES permit?			X

II.C. Technology-Based Effluent Limits (POTWs)

	Yes	No	N/A
1. Does the permit contain numeric limits for <u>ALL</u> of the following: BOD (or alternative, e.g., CBOD, COD, TOC), TSS, and pH?	X		
2. Does the permit require at least 85% removal for BOD (or BOD alternative) and TSS (or 65% for equivalent to secondary) consistent with 40 CFR Part 133?	X		
a. If no, does the record indicate that application of WQBELs, or some other means, results in more stringent requirements than 85% removal or that an exception consistent with 40 CFR 133.103 has been approved?			X
3. Are technology-based permit limits expressed in the appropriate units of measure (e.g., concentration, mass, SU)?	X		
4. Are permit limits for BOD and TSS expressed in terms of both long term (e.g., average monthly) and short term (e.g., average weekly) limits?	X		
5. Are any concentration limitations in the permit less stringent than the secondary treatment requirements (30 mg/l BOD5 and TSS for a 30-day average and 45 mg/l BOD5 and TSS for a 7-day average)?		X	
a. If yes, does the record provide a justification (e.g., waste stabilization pond, trickling filter, etc.) for the alternate limitations?			X

II.D. Water Quality-Based Effluent Limits

	Yes	No	N/A
1. Does the permit include appropriate limitations consistent with 40 CFR 122.44(d) covering State narrative and numeric criteria for water quality?	X		
2. Does the fact sheet indicate that any WQBELs were derived from a completed and EPA approved TMDL?			X

II.D. Water Quality-Based Effluent Limits – cont. (FY2003)	Yes	No	N/A
3. Does the fact sheet provide effluent characteristics for each outfall?	X		
4. Does the fact sheet document that a "reasonable potential" evaluation was performed?	X		
a. If yes, does the fact sheet indicate that the "reasonable potential" evaluation was performed in accordance with the State's approved procedures?	X		
b. Does the fact sheet describe the basis for allowing or disallowing in-stream dilution or a mixing zone?	X		
c. Does the fact sheet present WLA calculation procedures for all pollutants that were found to have "reasonable potential"?	X		
d. Does the fact sheet indicate that the "reasonable potential" and WLA calculations accounted for contributions from upstream sources (i.e., do calculations include ambient/background concentrations)?			X
e. Does the permit contain numeric effluent limits for all pollutants for which "reasonable potential" was determined?	X		
5. Are all final WQBELs in the permit consistent with the justification and/or documentation provided in the fact sheet?	X		
6. For all final WQBELs, are BOTH long-term AND short-term effluent limits established?	X		
7. Are WQBELs expressed in the permit using appropriate units of measure (e.g., mass, concentration)?	X		
8. Does the record indicate that an "antidegradation" review was performed in accordance with the State's approved antidegradation policy?	X		

II.E. Monitoring and Reporting Requirements	Yes	No	N/A
1. Does the permit require at least annual monitoring for all limited parameters and other monitoring as required by State and Federal regulations?	X		
a. If no, does the fact sheet indicate that the facility applied for and was granted a monitoring waiver, AND, does the permit specifically incorporate this waiver?			X
2. Does the permit identify the physical location where monitoring is to be performed for each outfall?	X		
3. Does the permit require at least annual influent monitoring for BOD (or BOD alternative) and TSS to assess compliance with applicable percent removal requirements?		X	
4. Does the permit require testing for Whole Effluent Toxicity?	X		

II.F. Special Conditions	Yes	No	N/A
1. Does the permit include appropriate biosolids use/disposal requirements?	X		
2. Does the permit include appropriate storm water program requirements?			X

II.F. Special Conditions – cont. (FY2003)	Yes	No	N/A
3. If the permit contains compliance schedule(s), are they consistent with statutory and regulatory deadlines and requirements?			X
4. Are other special conditions (e.g., ambient sampling, mixing studies, TIE/TRE, BMPs, special studies) consistent with CWA and NPDES regulations?	X		
5. Does the permit allow/authorize discharge of sanitary sewage from points other than the POTW outfall(s) or CSO outfalls [i.e., Sanitary Sewer Overflows (SSOs) or treatment plant bypasses]?			X
6. Does the permit authorize discharges from Combined Sewer Overflows (CSOs)?			X
a. Does the permit require implementation of the "Nine Minimum Controls"?			X
b. Does the permit require development and implementation of a "Long Term Control Plan"?			X
c. Does the permit require monitoring and reporting for CSO events?			X
7. Does the permit include appropriate Pretreatment Program requirements?	X		

II.G. Standard Conditions	Yes	No	N/A
1. Does the permit contain all 40 CFR 122.41 standard conditions or the State equivalent (or more stringent) conditions?	X		
List of Standard Conditions – 40 CFR 122.41			
Duty to comply	Property rights	Reporting Requirements	
Duty to reapply	Duty to provide information	Planned change	
Need to halt or reduce activity	Inspections and entry	Anticipated noncompliance	
not a defense	Monitoring and records	Transfers	
Duty to mitigate	Signatory requirement	Monitoring reports	
Proper O & M	Bypass	Compliance schedules	
Permit actions	Upset	24-Hour reporting	
		Other non-compliance	
2. Does the permit contain the additional standard condition (or the State equivalent or more stringent conditions) for POTWs regarding notification of new introduction of pollutants and new industrial users [40 CFR 122.42(b)]?	X		

Part II. NPDES Draft Permit Checklist (FY2003)

Region III NPDES Permit Quality Review Checklist – For Non-Municipals

(To be completed and included in the record for all non-POTWs)

-----NOT APPLICABLE-----

Part III. Signature Page (FY2003)

Based on a review of the data and other information submitted by the permit applicant, and the draft permit and other administrative records generated by the Department/Division and/or made available to the Department/Division, the information provided on this checklist is accurate and complete, to the best of my knowledge.

Name	<u>Becky L. France</u>
Title	<u>Water Permit Writer</u>
Signature	<u><i>Becky L. France</i></u>
Date	<u>11/29/12</u>